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Comparison among different decommissioning funds methodologies for nuclear installations

Final **Report**

Country Report Czech Republic

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Comparison among different decommissioning funds methodologies for nuclear installations

Final Country Report (WP 1/WP 3)

Czech Republic

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Summary

Overview

The Czech Republic currently hosts six commercial nuclear power reactors (Dukovany 1-4 and Temelin 1-2), three operating research reactors, two interim storage facilities for dry spent-fuel storage for the commercial NPPs and research reactors, and three LLW/ILW repositories in use. A third storage hall for spent fuel will become operational in 2006.

A deep geological final disposal (for both HLW and that portion of the ILW not meeting the acceptance criteria of the existing repositories) is being sought but is not yet in existence. The six NPPs are owned and operated by CEZ, a publicly traded company. Two-thirds of CEZ shares are owned by the government of the Czech Republic.

Apart from the comprehensive efforts required to clean up the environmental legacies from closed and operating uranium mining sites, decommissioning the commercial NPPs Dukovany 1-4 and Temelin 1-2 sites will constitute the vast majority of decommissioning effort and expense. NPPs Dukovany 1-4 are expected to terminate operation in 2015-2018 or 2025-2028 (provided a 10-year extension on the operating license is granted to CEZ). Termination of operations at NPPs Temelin 1-2 is expected in 2042-2043. For both plants a strategy of deferred decommissioning is foreseen.

Legal decommissioning framework

The legal framework for decommissioning nuclear installations is set by the Atomic Act and subsequent legal regulations. Decommissioning requirements comply with stage 3 of the IAEA scale for decommissioning, however re-establishment of a nuclear site to "green field" status is not required. The responsibility to pay for all decommissioning and nuclear waste management lies with the owners of nuclear facilities.

The decommissioning programme, including a respective decommissioning cost estimates, is an integral part of the operation licence of a nuclear facility granted by the State Office of Nuclear Safety (SUJB). Decommissioning cost estimates must be approved by the Radioactive Waste Repository Authority (RAWRA) before being submitted to SUJB.

Decommissioning cost estimates

As of 31.12.2005 decommissioning cost estimates covering the technical decommissioning amounted to 16.4 billion CZK (580 million EUR) for NPPs Dukovany 1-4, and 13.7 billion CZK (480 million EUR[1]) for NPPs Temelin 1-2. Any liability resulting from spent-fuel management (e.g., costs for on-site interim storage) and all costs related to final nuclear waste disposal is not covered by these estimates. Estimated decommissioning costs are based on the price basis of the year in which the estimate is done. Estimates reflect undiscounted decommissioning cost assumptions. Decommissioning cost estimates must be updated every five years.

[1] Exchange rate 100 CZK = 3,52 EUR (as of 4 April 2006)

Costs for nuclear waste management are borne by the Nuclear Account (see below). The main contribution to the Nuclear Account derives from CEZ which currently must pay a rate of 50 CZK (1.8 EUR) for each MWh produced by the NPPs Dukovany 1-4 and Temelin 1-2. The payment rate is based on undiscounted cost estimates. The accruals to the Nuclear Account might be adapted at some point to account for future cost increases.

Decommissioning funding methodology

With its implementation in 1997, the Atomic Act obliged private operators of all major nuclear facilities to steadily make adequate financial provisions for the costs for the technical decommissioning of their nuclear installations which are in accordance with the decommissioning programme approved by SUJB and RAWRA. As this funding methodology was considered not to be secure enough (e.g. in view of potential bankruptcies of obliged companies), the Atomic Act was revised in 2002 and private licensees of nuclear installations are now forced to make annual payments into a blocked account.[2] Blocked accounts are kept by the operator, but financial means may only be withdrawn for decommissioning purposes and after RAWRA's approval. Interest from the blocked accounts is income to this account. A transition period of five years was granted to CEZ, in which they have to transfer all decommissioning provisions created since 1997 (when the Atomic Act came into force). The adequacy of financial reserves accumulated in the blocked accounts is monitored annually by RAWRA.

In addition, private operators of nuclear facilities are required to pay into a so-called Nuclear Account, a dedicated external fund which pays for ongoing radioactive waste management activities carried out by RAWRA, as well as the preparation and construction of a permanent repository for spent fuel and decommissioning waste. RAWRA is the regulatory agency responsible for the proper storage and disposal of radioactive waste and is also the sole owner of waste repositories in the country. On the date RAWRA accepts radioactive waste in one of its repositories the waste passes into the ownership of the State. The Nuclear Account is managed by the Ministry of Finance which is entitled to invest disposable means on the financial market.

Transparency

Information on specific decommissioning strategies of different nuclear installations as well as the main structure and principles of the different decommissioning funding schemes is public. Although there is no comprehensive reporting scheme specifically focussing on the decommissioning funding methodology several publications which are available to a broader public report regularly about the respective funds. However, there is little in-depth information on decommissioning cost estimates beyond aggregate figures on the plant level.

[2] The blocked accounts can be classified as internally managed segregated funds with all assets being earmarked for decommissioning purposes.

1 Introduction

1.1 Overview

In the Czech Republic approximately 25 TWh of electricity are produced by the six commercial nuclear power plants (NPPs). This corresponds to about 32% of the total electricity supply. The Czech Republic is a net electricity exporter with a positive export balance of approximately 16 TWh per year (IEA 2005). Though the construction of additional nuclear units is not ruled out as a matter of policy, the country's electricity surplus makes nuclear expansion unlikely for the foreseeable future.

Apart from the commercial power reactors the country currently hosts three operating research reactors, two interim storage facilities for the commercial NPPs and research reactors (with a third storage hall becoming operational in 2006) and three operational repositories for low- and mid-level radioactive waste. An appropriate long-term repository for high-level radioactive waste is being sought but is not yet in existence.

All major nuclear facilities are still in use. Apart from the comprehensive efforts required to clean up the environmental legacies from closed and operated uranium mining sites, decommissioning the sites of the six commercial NPPs will constitute the vast majority of decommissioning effort and expense.

1.2 Nuclear Facilities

1.2.1 Power Plants

Both nuclear power plants in the Czech Republic are owned and operated by the CEZ power company. CEZ is a publicly traded company listed on the Prague stock exchange, with two-thirds of the shares owned by the government of the Czech Republic. The National Property Fund (NPF) which holds the shares has passed its shareholding rights to the Ministry of Industry and Trade.[3]

Dukovany NPP: Fully operational since 1987, the Dukovany NPP has four reactors of the Russian WWER 440/V213 type, with a total net generation capacity of about 1.600 MW (IAEA 2003).

Temelin NPP: Fully operational since 2002, the Temelin NPP has two reactors of the WWER 1000/V320 type, with a total net generation capacity of about 1.800 MW (IAEA 2003). Since the NPPs were taken into operation both reactor blocks faced several technical problems which are reflected in its relatively low annual energy availability factor.

[3] The remaining CEZ shares are owned, at present, by companies and corporations (28.5%) and individuals (3.9%). More information about CEZ is available on its website http://www.cez.cz.

1.2.2 Research Reactors

There are three operational research reactors in the Czech Republic. Two experimental reactors (named LVR-15 and LR-O) are located near Prague at the Nuclear Research Institute Rez (UJV Rez). One training reactor (named VR-1) is operated by the Czech Technical University's Faculty of Nuclear Sciences and Physical Engineering in Prague (IAEA 2003). A fourth research reactor, SR-0, was completely decommissioned between 1992-1996.

LVR-15: The reactor which was originally named VVR-S started operation in 1957 and served as a multi-purpose research installation for the Czechoslovak nuclear program. Essential reconstruction took place in 1989, when all process equipment including the reactor vessel was replaced. LVR-15, which now holds a maximum thermal capacity of 10 $MW_{th,}$ received a new operating licence in 2003 from SUJB, with approval to continue operating until the end of 2014 (SUJB 2004, Annex 8).

LR-O: LR-0, which has a thermal capacity of 5 $kW_{th,}$ started permanent operation in 1983. UVJ Rez operates the reactor to perform research on core physics and storage racks, and also to simulate neutron fields in commercial power reactors. The reactor has been designed to operate until the end of 2010. Correspondingly, UJZ Rez received approval in 2003 to operate the reactor until the end of 2009 (SUJB 2004, Annex 8).

VR-1: VR-1 is a small reactor used for training purposes at the Czech Technical University in Prague. The reactor has a thermal capacity of 5 kW_{th} and was commissioned in 1990 (SUJB 2004, Annex 8).

LR-0 and VR-1 do not produce any spent fuel due to their small thermal output and limited time of operation (SUJB 2005).

SR-0: SR-0, commissioned in 1971, had a thermal capacity of 5 kW_{th}. The research reactor was operated by Skoda Plzen. The reactor was shut down in 1989. Decommissioning of the reactor was completed during the years 1992-1996. The area of the facility is presently released for unrestricted use (SUJB 2004, Annex 8; Belgatom, et al. 2000).

Nuclear Research Institute Rez: UJV Rez (founded in 1955) is a commercial organisation under private law whose primary mission is research and development in the fields of nuclear technology and radioactive waste management. The institute is a non-profit organisation in the sense that all profit is reinvested into its own growth and is not distributed as dividends. UJV Rez plays the role of an R&D arm of CEZ, which holds a majority shareholder position of 52.4% in the institute.

1.2.3 Nuclear Fuel Cycle Facilities

Mining and milling: The state-owned company DIAMO operates the only underground uranium mine in the Czech Republic, with a capacity of 400 tons of uranium per year. Originally expected to close in 2006, the closure of the Rozna mine has recently been postponed to 2008. The Rozna mine is also the last uranium mine operating in the EU. All other mines in the Czech Republic have been closed and are being remediated. As a by-product of remediation activities at closed mines, an additional 100 tons of uranium per year are recovered for use in nuclear facilities (NEA 2006). DIAMO is carrying out decommissioning and restoration activities on 20 closed mining and milling sites to mitigate the heavy environmental damage stemming from those activities. The decommissioning programme is expected to last until 2040 (IAEA 2005).[4]

Fuel supply: For NPPs Dukovany 1-4, uranium is supplied domestically, while the conversion, enrichment and fuel fabrication services are purchased in Russia. The initial fuel for the NPPs Temelin 1-2 was purchased from Russia, but future reloads of the facility will utilise Czech uranium. Temelin relies on conversion services purchased in France and Canada, as well as enrichment and fuel fabrication services purchased in the United States. The Czech research reactors use fuel and uranium from Russia.

Spent-fuel interim storage: CEZ, as generator of spent fuel, is responsible for its storage. The reactor pools at each NPP can store six years' worth of spent fuel. Since 1995, the NPPs Dukovany 1-4 have also utilised an interim dry-cask storage facility (ISFSF), with a capacity of 600 tons. The capacity of ISFSF was expanded by commissioning a second storage hall of this type (SFSF) which will have a capacity of 1,340 tons and which will be operational in 2006. A spent-fuel storage facility will also be needed at NPPs Temelin 1-2 by the time the reactor-pool capacity there is reached. The facility is expected to be operational in 2014 (Davidova 2006). The planned capacity of this storage will be 1,370 tons. At the UJV-Rez research reactor, the spent-fuel interim storage facility (Building 211/8), operational since 1996, has sufficient capacity to store all spent fuel generated at the facility (SUJB 2005).

Final disposal facility: For the final disposal of HLW the construction of a deep geological repository is planned. Based on a preliminary timetable, the final approval of a deep geological repository site is expected in 2015, with construction scheduled to begin in 2030 and last until the facility is commissioned sometime around 2065 (NEA 2006).

Repositories for ILW/LLW: Currently four repositories exist (SUJB 2005):

- On the site of the NPP Dukovany, there is a shallow land repository (Dukovany Radioactive Waste Repository) for all low- and intermediate-level waste from the Dukovany and Temelin NPPs.
- Repository Richard (located near Litomerice) is an underground repository located in the complex of the former limestone mine Richard II. The anticipated closing date for this repository is 2018.
- Additional repositories are located in Jachymov (repository Bratrstvi) and Hostim. The latter was used to dispose RAW of institutional origin and has been closed in the meantime.

[4] An overview of all Czech uranium mining sites is provided by http://www.wise-uranium.org/uddcz.html.

Previously, the repositories had been privately owned and operated. In 2000 all four repositories operating in the Czech Republic were put into public ownership, with RAWRA now responsible for safe management of the facilities.

1.3 Decommissioning Methodology

1.3.1 Overview

The Czech Atomic Act defines "decommissioning" as activities aimed at releasing nuclear installations or workplaces where radiation practices were performed, for their utilisation for other purposes. This does not require operators of nuclear facilities to re-establish a nuclear site to "green field" (which would also include, for example, the dismantling of non contaminated buildings). Rather, operators of facilities which fall under the supervision of the Atomic Act must remove all radioactive materials so that the respective facilities can be released out of the scope of the Atomic Act. In this regard the way how the term decommissioning is defined in the Czech Republic is compatible with stage 3 of the IAEA scale for decommissioning.

Under Czech law, the owners of nuclear facilities are required to pay for decommissioning and waste disposal, and licensees are obligated to have adequate decommissioning funds in place at the time decommissioning activities begin. Licensees' decommissioning plans and budgets are subject to RAWRA's approval and form the basis for the annual accumulation of decommissioning funds. To help ensure adequate decommissioning funds, nongovernmental licensees are required to evenly accumulate reserves in blocked accounts. Withdrawals from these accounts may only be used for decommissioning purposes and with the approval of RAWRA.

1.3.2 Institutional set-up

Several governmental institutions are involved in regulating decommissioning-related activities. The two main institutions are the State Office of Nuclear Safety (SÚJB) and the Radioactive Waste Repository Authority (RAWRA). Key roles in the area of nuclear waste and decommissioning are also played by the Ministry of Industry and Trade and the Ministry of Finance.

State Office of Nuclear Safety (SUJB): SUJB is the primary nuclear regulator in the Czech Republic, directly reporting to the Premier of the Czech Government. SUJB is licensing the planning, construction, operation and decommissioning of all nuclear facilities, as well as the handling, transport and trade of nuclear materials. SUJB is responsible for ensuring the safe operation of nuclear facilities and protecting the public from ionizing radiation. SUJB approval is also required on all decommissioning plans and decommissioning budgets of licensees (SUJB 2006).

Radioactive Waste Repository Authority (RAWRA)[5]**:** RAWRA is the regulatory agency responsible for preparation, construction, commissioning, operation and closure of radioactive waste repositories and monitoring of their impact on the environment. In this regard, RAWRA is the sole owner of waste repositories in the country. Furthermore, RAWRA is responsible for the proper storage and disposal of radioactive waste. RAWRA oversees payments to the Nuclear Account - a dedicated account which pays for radioactive waste management (see section 3). RAWRA is also responsible for monitoring the adequacy of financial reserves accumulated by licensees for the purpose of funding eventual decommissioning of their installations. Though decommissioning plans and budgets are overseen by SUJB, the decommissioning cost estimates provided by licensees are first verified by RAWRA prior to SÚJB approval (RAWRA 2006). RAWRA is assigned to the Czech Ministry of Industry and Trade.

Ministry of Industry and Trade (MPO): This ministry issued financial regulations (Decree 360/2002 Coll.) overseeing the creation and accumulation of financial reserves for nuclear decommissioning.

Ministry of Finance: The disposal costs for radioactive waste and spent fuel are paid out of a dedicated state-owned account (Nuclear Account) managed by the Ministry of Finance. The continuous collection of funds to this account ensures that the waste disposal costs are not transferred to future generations.

1.3.3 Legal framework

Atomic Act: The main legislation regulating the use of nuclear materials is the Atomic Act[6] of 1997 (Act No. 18/1997 Coll.). The Act stipulates the responsibilities of the regulatory agencies SUJB and RAWRA, as well as the methods and financing of decommissioning. The bill requires that owners of nuclear facilities pay all associated decommissioning costs and requires them to make complete financial provision prior to decommissioning in the form of regular payments to blocked accounts. However, the obligation to make provision for the decommissioning does not apply to organisational units of the state, state-subsidised organisations and public universities. In addition, all owners of nuclear facilities (e.g. including universities) are required to pay into the Nuclear Account, an account operated by the Czech National Bank to fund ongoing waste management activities conducted by RAWRA as well as the preparation and construction of a permanent repository for spent fuel and decommissioning waste.

Decree 360/2002 Coll.: The detailed regulations regarding decommissioning funding are specified by the Ministry of Industry and Trade in Decree No. 360/2002 Coll. The regulations describe how nuclear licensees are to create and accumulate decommissioning reserves. The reserves may solely be used for decommissioning activities and RAWRA must approve all expenditures from the funds.

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5 The acronym SÚRAO (an abbreviation of the Czech name for RAWRA) is also seen in literature referring to the agency.

6 As amended by Act No. 13/2002 Coll. and Act No. 310/2002 Coll.

Act No. 416/2002 Coll. (replacing Act No. 224/1997 Coll.): This legislation regulates the amounts and terms of payments to the Nuclear Account. NPPs are required to pay a fee of 50 CZK for each MWh generated at the facility. Other radioactive waste producers (those not generating electricity) are not required to make advanced payments to the Nuclear Account, instead paying at the time of waste disposal.

Decree 185/2003 Coll.: This regulation stipulates the methods and extent of decommissioning required, and provides detailed rules regarding the preparation and termination of decommissioning activities. The regulation also states the documentation and cost-estimation requirements related to decommissioning of licensed facilities.

1.3.4 Analysed nuclear facilities

In this report, the following nuclear facilities will be assessed in detail regarding their decommissioning funding methodology:

- NPPs Dukovany 1-4 and Temelin 1-2
- Research Reactor LVR-15
- Interim Storage ISFSF Dukovany
- Dukovany Radioactive Waste Repository

The Dukovany Radioactive Waste Repository will not be decommissioned after its closure, as the site will not be released in the short term out of the scope of the Atomic Act. However, as the facility is the second largest repository for LLW, which will receive a significant portion of the LLW from the decommissioning of the six commercial NPPs, it is a key site warranting analysis in the context of decommissioning.

Cleaning up the legacies of uranium mining (see section 2.1.4) constitutes the decommissioning activity with the largest costs in the Czech Republic. However, for this country report it has been decided not to focus on this important liability, as most costs resulting from these decommissioning activities must be paid by the state.

Table 1 Overview of nuclear installations in the Czech Republic (Status: 04/2006)

Nuclear facility	Short name	Kind of facility*	Output (MW_{el})	First criticality (in case of reactors)	Operational period	Operating company	Quoted companies holding shares in the nuclear facility	Percentage of shares held***	Decomm. started in year	Decomm. stage****	Analysed in this report
Dukovany 1		NPP	388	12.02.1985	1985-today	CEZ	CEZ	100%			X
Dukovany 2		NPP	388	23.01.1986	1986-today	CEZ	CEZ	100%			X
Dukovany 3		NPP	388	28.10.1986	1986-today	CEZ	CEZ	100%			X
Dukovany 4		NPP	388	01.06.1987	1987-today	CEZ	CEZ	100%			X
Temelin 1		NPP	912	11.10.2000	2000-today	CEZ	CEZ	100%			X
Temelin 2		NPP	912	31.10.2002	2002-today	CEZ	CEZ	100%			X
LVR-15 [a)]		RR	10 MW_{th}	1989	1989-today[b)]	UJV Rez (Nuclear Research Institute)	No [c)]				X
LR-0		RR	5 kW_{th}	19.12.1982	1982-today[d)]	UJV Rez	No [c)]				
VR-1 (Training Reactor)		RR (Training reactor)	5 kW_{th}	03.12.1990	1990-today[e)]	Czech Technical University (Faculty of Nuclear Sciences and Physical Engineering)	No				
SR-0 Research Assembly, Plzen		RR	2 kWth	01.01.1971	1971-1989	Skoda Plzen			1990	3	
ISFSF Dukovany		Interim storage for spent fuel (dry surface storage)			1997-today	CEZ	CEZ	100%			X
SFSF Dukovany		Interim storage for spent fuel (dry surface storage)			2006 (scheduled)	CEZ	CEZ	100%			

HLW Storage facility at LVR-15 (Building 211/8)		Interim storage for spent fuel (dry storage)			1997-today	UJV Rez	No [c]				
SF Storage Facility at LVR-15 (Building 211/7) [f]		Temporary storage of spent fuel (pool storage)			?	UJV Rez	No [c]				
RAW Management Facility Velké zbytky at LVR-15 (Building 241)		Processing station for nuclear waste			1963-today	UJV Rez	No [c]				
Dukovany		Radioactive waste repository (above ground)			1995-today	RAWRA	No				X
Richard		Repository for institutional waste (underground)			1964-today	RAWRA	No				
Bratrstvi		Repository mainly for RAW from healthcare (underground)			1974-today	RAWRA	No				
Hostim		Repository for LRW from research facilities (underground)			1959-1964	RAWRA	No		Closed in 1997		
Rozna		Uranium mine (underground)			1957-today	DIAMO [g]	No				
Uranium mining sites		Closed uranium mining sites incl. respective periphery and infrastructure				DIAMO	No				

* Kind of facility: NPP = Nuclear Power Plant RR = Research Reactor

** Quoted: quoted on the stock exchange. Quoted companies directly or indirectly owning the nuclear installation or at least a part of it.

*** Percentage of direct or indirect shares held by companies quoted on the stock exchange.
**** Decomm. = Decommissioning.

Decommissioning stages:
Operating: Still in operation; not shut down yet

0	Decommissioning announced
1	Decommissioning to stage 1
2	Decommissioning to stage 2
3	Decommissioning to stage 3
3*	Decommissioning to stage 3 without civil engineering
-x	Decommissioning in progress towards stage x

Complementary information:

a)	LVR-15 replaced the former research reactor VVR-S.
b)	The current licence is valid until 2014. Design lifetime of the reactor is until 2018.
c)	UJV Rez is a public commercial organisation of which CEZ is the main shareholder (52,46%).
d)	The current licence is valid until 2009. Design lifetime of the reactor is until 2010.
e)	The current licence is valid until 2006.
f)	The storage facility is part of the LVR-15 reactor and therefore it does not have a separate license for the operation
g)	DIAMO is state is a state owned company

Sources: IAEA (2003), SUJB (2003, 2005), SUJB (2004), Websites of SUJB (www.sujb.cz), RAWRA (www.rawra.cz), CEZ (www.cez.cz), UJV Rez (www.nri.cz)

2 Decommissioning strategies and costs

2.1 Current and past decommissioning activities

Little decommissioning has taken place in the Czech Republic. The main decommissioning projects involved the research reactors LVR-15 and SR-0, the closure of the repository Hostim, and clean-up work at some uranium mines.

2.1.1 Research reactor LVR-15

In the years 1988-1998, the former research reactor VVR-S (taken into operation in 1957) was comprehensively reconstructed and replaced by the new reactor LVR-15. The reconstruction included the removal of the pressure vessel, which is now stored on the site of the Institute UVJ Rez (Belgatome, et al. 2000). Decommissioning costs were partly paid by the state (in particular applicant to the time period before UJV Rez was privatised) and UJV Rez (Pazdera 2006).

2.1.2 Research reactor SR-0

The Research Reactor SR-0 was shut down in 1989. Decommissioning of the reactor started in 1992 and was completed in 1996. The site has been released for unrestricted use (Belgatome et al 2000). In the context of this report no information was found about the decommissioning strategy and costs related to the removal of this reactor.

2.1.3 Closure of repository Hostim

The repository Hostím in Beroun is an underground repository which lies approximately 30 meters below the surface. The repository, which was built in 1959 in an existing limestone mine, has a storage volume of approximately 1.690 m^3. The repository holds low-and intermediate-level wastes from UJV Rez and the Institute for Research, Production and Utilization of Radioisotopes (UVVVR) in Prague. The repository was in operation until 1965 and was decommissioned in 1997. Decommissioning activities included filling the repository with a special concrete mixture. Before the filling, the material was inventoried and all long-term radionuclide sources and chemical wastes were removed from the repository. In 1990 the repository was added to the system of repositories provided for and funded by the Czechoslovak Atomic Energy Commission due to the state-guaranteed care of old loads (SUJB 2005). Today the repository is under the exclusive control of RAWRA. The decommissioning costs amounted to approximately 10 million CZK (350.000 EUR). All related decommissioning activities were paid by the Ministry of Industry and Trade (Duda 2006).

2.1.4 Uranium Mining Sites

Currently, the decommissioning of closed uranium mining and milling sites (including uranium waste rock and mill-tailing deposits) constitutes the most significant decommissioning activity in the Czech Republic. Between 1989 and 2003 decommissioning costs for uranium sites under the responsibility of DIAMO amounted to approximately 21 billion CZK (750 million EUR) excluding social costs for miners. Vast restoration costs are associated with the groundwater cleanup programmes for the former sites in which uranium was extracted by in situ leaching (e.g., Stráz pod Ralskem). The total costs for cleaning up the uranium sites until 2040 are expected to reach 80 billion CZK (2.8 billion EUR) (Prague Post 06.11.2003). These costs are covered by the state budget.

2.2 Future decommissioning strategies

2.2.1 Principal decommissioning concepts

NPPs Dukovany 1-4 / Temelin 1-2

So far there is no experience in the Czech Republic with the decommissioning of large commercial NPPs. When it comes time for their decommissioning, both the Dukovany and Temelin NPPs will utilise a safe-enclosure period (deferred decommissioning), followed by the main decommissioning work of decontamination, disassembly and demolition (NEA 2005). As specified in Czech law, decommissioning will terminate when the site can be released for utilisation for other purposes. It is not necessary to return the site to green-field status (see section 1.3.1).

Spent fuel removed from the NPPs' reactor vessels and storage pools shall first be held at ISFSF/SFSF Dukovany (in the case of the Dukovany NPP) or at the planned SFSF Temelin (in the case of the Temelin NPP) until the material is reclassified as RAW in compliance with the Atomic Act. It will then be forwarded to RAWRA for final disposal. (SUJB 2005)

Research reactors

It is currently anticipated that decommissioning of the research reactor sites will begin soon after shutdown. However decommissioning of parts of the reactor might be delayed due to economic optimisation assumptions (e.g. taking into account decay times for specific radionuclides). Returning the site to green-field status is not required and not foreseen (Pazdera 2006).

Individual decommissioning strategies have been elaborated for the research reactors and the spent fuel storage facilities. Decommissioning of some of these facilities might be paid out of the National Property Fund dedicated to fund some of the old environmental liabilities of the Czech Republic (Duda 2006).

Interim Storage facilities Dukovany/ Temelin (in the planning stage)

The decommissioning of these dry-cask storage facilities will consist primarily of removal of the casks and the cleanup of any remaining contamination of the site and structures. Given that the casks themselves are the primary containment mechanism for the spent fuel, the contamination at these sites is anticipated not to be too severe. Once all wastes and contamination are removed, and radiation levels are verified to meet requirements, the sites will be released per the implementing regulations of SUJB (SUJB 2005).

It is anticipated that no decontamination work will be required at the on-site interim storage facilities, due to the dry-cask storage methods used. No dismantling or demolition work is envisaged since the facilities will eventually be used for the storage of the waste resulting from the decommissioning of the respective NPPs (SUJB 2005).

No contaminated material, contaminated equipment, or contaminated structure shall remain in the storage facility after decommissioning of the respective NPPs has been completed. The main decommissioning activities for the interim storage facilities shall comprise radiation monitoring (as the basis for evidence that the level of surface contamination on any parts of facilities is kept within the limits prescribed for unlimited use), updates of the existing documentation, and preparation of the documentation needed for finally releasing of the facility from the scope of the Atomic Act (SUJB 2005).

Repositories

All three repositories - Dukovany, Richard, and Bratrstvi - are classified as final repositories. The decommissioning of these repositories will involve closing the sites permanently with the waste staying in place on the site. It is not foreseen to transfer the waste to the deep geological repository (Duda 2006).

2.2.2 Waste management and disposal strategies

It is important to note that the state takes legal ownership of all nuclear waste, which is stored or disposed, in a waste facility operated by RAWRA. This applies to all repositories for ILW and LLW, as well as the planned deep geological final disposal site.

NPPs Dukovany 1-4 / Temelin 1-2

a) **Spent fuel:** Spent fuel from the commercial NPPs is first stored in the on-site reactor pools located at Dukovany and Temelin, respectively. Storage in the pools reduces the residual heat output, reducing the thermal energy and radiation levels of the spent fuel assemblies to levels low enough to permit their transfer to dry-cask storage, also on site at the NPPs (see section 1.2.3).[7] After a deep geological final disposal facility has been established and is ready to accept waste (expected to occur in 2065), the casks will be transferred there for permanent storage (SUJB 2005). Under Czech law, CEZ may transfer ownership of the spent fuel to the state (i.e. RAWRA) at any time, should they wish to declare the spent fuel as waste. It is anticipated, however, that CEZ will transfer ownership to RAWRA at the time the spent fuel has been transferred to the deep geological repository (Duda 2006).

b) **LLW/ILW waste from operation:** Before being transferred to the radioactive waste repository Dukovany, LLW waste is primarily stored at auxiliary service buildings located on site at Dukovany and Temelin. Liquid LLW is also initially stored at these auxiliary service buildings in storage tanks or drums. In some cases, the liquid waste undergoes a bituminization process prior to storage. Gaseous RAW is removed with venting technology and processed into solid RAW. ILW (which is not accepted at the repository Dukovany) is temporarily stored on site to be disposed of at the time the respective NPP is decommissioned (SUJB 2005).

7 Although CEZ does not consider reprocessing as economical at the moment, it is not excluded that CEZ will choose this option of fuel management at a certain time in future (NEA 2006).

c) **decommissioning waste:** All HLW from decommissioning will be either temporarily stored on site or will (depending on the activity levels after the period of safe enclosure) be directly transferred to the deep geological repository, assuming the site will be operational at that point in time. ILW or LLW that meets the acceptance requirements for placement at the Dukovany repository will disposed there. Waste exceeding these acceptance levels will also be directly transferred to the deep geological final disposal (Duda 2006).

Research reactor LVR-15

a) **spent fuel:** Spent fuel removed from the reactor core of LVR-15 is stored in the spent fuel pool in the reactor hall. Temporary storage of active materials and spent fuel also takes place in the two wet storage pools in Building 211/7. Dry storage of solid radioactive waste and spent fuel takes place in Building 211/8, built during the period 1981-88, and modified in 1995 to meet SUJB specifications. The building holds the spent fuel from the research reactors VVR-S and LVR-15, as well as radioactive waste from its research workplaces (SUJB 2005). Once the planned deep geological repository is ready, there is an option that spent fuel may be directly sent there (as soon as it complies with the acceptance criteria of this site). Alternatively UVJ Rez has the option of sending spent fuel from the facility back to Russia for reprocessing. In this case vitrified HLW from reprocessing would then return to the Czech Republic for final disposal at a later point in time (Pazdera 2006).

b) **LLW/ILW waste from operation:** LLW and ILW from the operation of LVR-15 are disposed at the radioactive waste repository Richard (provided the acceptance criteria are met) or stored in the storage facilities operated by UJV Rez. Repository Richard applies higher acceptance criteria than the repository in Dukovany.

c) **decommissioning waste:** HLW from decommissioning the research reactor might be temporarily stored in the existing HLW storage (currently used for spent fuel interim storage). Once the planned deep geological repository is ready, waste may be sent there. ILW and LLW from decommissioning will be disposed in the repository Richard.

2.2.3 Expected decommissioning schedule

NPPs Dukovany 1-4 / Temelin 1-2

Power production at the NPPs Dukovany 1-4 is expected to end by 2015. After removal of the fuel and preparation of the facility, a safe enclosure period of 50 years will ensue. The facility will then be demolished over a ten-year period, with final release of the site expected in 2086. The following table summarises the Dukovany decommissioning schedule (NEA 2005). The schedule is tentative and subject to change. For example, the operator CEZ anticipates a 10-year extension of the operating lifetime of the facility (CEZ 2004). Even with a lifetime extension the decommissioning end date would not change (Duda 2006).

Shut-down of units	2015-2018

Transfer of used fuel from the fuel storage pond	2022-2025
Preparation of safe enclosure (including demolition of the 1st operational building)	2015-2025
Operation of safe enclosure	2026-2075
Disassembling and demolishing of the active buildings	2076-2085
Releasing of the locality	2086

Shutdown at the NPPs Temelin 1-2 is expected in 2042. A shorter safe enclosure period of 35 years is envisaged, followed by a ten-year demolition period and the final release of the site in 2091. The following table summarises the Temelin decommissioning schedule (NEA 2005).

Shut-down of units	2042-2043
Transfer of used fuel from the fuel storage pond	2047-2048
Preparation of safe enclosure	2047-2049
Operation of safe enclosure	2047-2082
Disassembling and demolishing of the active buildings	2082-2091
Releasing of the locality	2091

Research reactor LVR-15: The expected year of shutdown of this research reactor is 2014 (end of current operation licence. Decommissioning is expected to start in 2018 and to be terminated in 2031 (Pazdera 2006).

Interim Storage facilities Dukovany: It is planned to start decommissioning of the ISFSF and SFSF in 2070 and 2073 respectively. Decommissioning of these facilities is expected to be completed within one year (Davidova 2006).

Dukovany Radioactive Waste Repository: The anticipated closing date for this repository is 2100 (Duda 2004). As this repository is classified as a final repository no major decommissioning activities are foreseen (see section 2.2.1).

Planned deep geological final disposal: Research and development works including the siting and the site preparation are expected to run up to 2050. After it in the period 2053 - 2070 the surface and the underground facilities will be constructed. The operation of the first part of the repository is expected to start in 2065 (RAWRA 2006).

2.2.4 Distribution of Decommissioning Management Responsibilities

Those applying for a licence for NPP construction, NPP commissioning or NPP operation must submit documentation to SUJB relevant to decommissioning of the nuclear installation. The specific documentation requirements are detailed in Annexes B, C and D of the Atomic Act.

In addition, the Atomic Act requires all operators of nuclear installations (including operators of NPPs, research reactors, storage facilities, and nuclear waste repositories) to apply to SUJB for a license for all particular stages of decommissioning of a nuclear installation (Atomic Act, Section 9, para. 1g). Thus, CEZ is responsible for decommissioning its six commercial NPPs as well as the interim storage facilities operated on the NPP sites. Decommissioning of the research reactor LVR-15, all storage facilities linked to LV-15, as well as the research reactor LR-0 is in the responsibility of UJV-Rez.

The contents of the decommissioning documentation to be approved by SUJB are as follows (see Annex G of the Atomic Act, entitled “Documentation for the issue of a licence for individual stages of decommissioning of a nuclear installation or category III or IV workplace”):

1. Evidence of availability of finance for decommissioning activities;
2. Description of changes to local area due to nuclear installation operation;
3. Description of technical procedures proposed for decommissioning;
4. Decommissioning time schedule;
5. Method of dismantling, decontamination, conditioning, transport, storage and elimination of parts of installation contaminated by radionuclides;
6. Assumed types and activities of radionuclides discharged into the environment and radioactive waste generated;
7. Method of radioactive waste management, including its disposal;
8. Limits and conditions for safe management of radioactive waste during decommissioning process;
9. Safety analyses;
10. Scope and method of measurement and evaluation of exposure of exposed workers and other persons and contamination of the workplace and its vicinity by radionuclides and ionising radiation;
11. On-site emergency plan;
12. Evidence of provision of physical protection of decommissioned nuclear installation.

The scope and form of the decommissioning documentation as well as the scope and method of the decommissioning itself are detailed in SUJB’s decree on decommissioning (185/2003 Coll.).[8] All decommissioning activities are overseen by SUJB. Immediately after termination of the decommissioning activities, the holder of the decommissioning licence must notify SUJB that decommissioning has been completed and prove that nuclear safety, radiation protection, emergency preparedness and physical protection meet the relevant regulations (Decree 185/2003 Coll., Section 6).

[8] Decree 185/2003 Coll. allows immediate or deferred decommissioning as allowable decommissioning methods.

The schedule of planned decommissioning activities (including a description of these activities) and an assessment of decommissioning costs is required as part of the documentation submitted to SUJB when requesting an operating licence for a nuclear installation. These costs must be elaborated as a sum of costs of individual decommissioning activities. The cost estimates must refer to the planned time schedule of decommissioning activities, and be calculated using the regular prices in the year when the assessment was made (see section 2.2.5). Prior to submittal of the decommissioning costs to SUJB, the cost estimates for the decommissioning must first be approved by RAWRA (Decree 185/2003 Coll., Section 8).

The decommissioning documentation must reflect the actual condition and history of operation of the nuclear installation. An update to both the decommissioning proposal and its cost estimate must be completed at least every five years (Decree 185/2003 Coll., Section 7).[9]

2.2.5 Decommissioning costs estimates

NPPs Dukovany 1-4 / Temelin 1-2

CEZ and RWARA report cost estimates of 16,4 billion CZK (580 million EUR, 2003 price level) for decommissioning NPPs Dukovany 1-4, and 13,7 billion CZK (480 million EUR, 2004 price level) for decommissioning NPPs Temelin 1-2 (Davidova 2006, Duda 2006). Compared to the cost estimates published by CEZ in 2001, the estimated decommissioning costs have increased by 25% (CEZ 2001). According to CEZ the large rise of the cost estimates is justified with individual cost items having been recalculated with respect to current prices published by professional and authorized institutions (Davidova 2006).

The cost estimates cover all decommissioning activities outlined within the decommissioning documentation. According to CEU the estimated costs can be allocated to the different types of decommissioning activities as follows: preliminary costs 24%, safe enclosure costs 25%, technical decommissioning costs 51% (Davidova 2006). Any costs for waste storage or waste disposal is covered by the Nuclear Account (see section 3.1.2) and is thus not included in the above listed figures.

Cost estimates result from the NPPs' decommissioning programmes, which are part of the licensing documentation (see section 2.2.4). The estimates are done on contractual basis by engineering companies commissioned by CEZ (Davidova 2006). Cost estimates need to be revised every five years and need to be approved by RAWRA (see section 2.2.4). Approval is done by staff of RAWRA assisted by several independent external auditors.

Cost estimates are based on actual price lists published by professional and authorized institutions (e.g., Institute of Civil Engineering); catalogue prices of similar installations;

[9] In case the operation will be terminated due to extraordinary events, the originally planned method of decommissioning shall be re-evaluated and the documentation, with regard to such facts, must be updated.

price lists of companies selling the considered instrumentation and devices; data provided by civil engineering and installation contractors; and expert estimates (Duda 2004). The calculation of the costs for the different decommissioning stages and different types of decommissioning activities is based on cost review and update technique supported by expert opinion. Moreover the calculation is based on a generally accepted algorithm for calculation of decommissioning costs. The methodology for the cost calculation is based on the standardised work breakdown structure for decommissioning projects and the methodology laid down in the legislation (sum of costs for individual decommissioning activities for assumed time schedule of decommissioning) (Davidova 2006).

Estimated decommissioning costs are based on current prices, meaning the price basis corresponds to the year the estimate is done. Estimates reflect undiscounted decommissioning-cost assumptions. Decommissioning cost estimates must be updated (and approved by RAWRA) every five years, taking into account any change of cost assumptions and the current price basis. The requirement to update the cost estimates continues until decommissioning has begun. In the case of the commercial NPPs, which follow a strategy of deferred decommissioning, CEZ is obliged to recalculate the respective cost estimates (and to adapt its accruals to the blocked account, see section 3.1.1) also for the period in which the reactors are in safe storage (Duda 2006).

With respect to price increases it is anticipated that interest on the principal in the account (see sections 3.1.1 and 3.1.3) will generally compensate for real price increases and inflation, which would also help to ensure the adequacy of future funds.

Research reactor LVR-15

The current cost estimate for decommissioning of the research reactor LVR-15 is 125.7 million CZK (4.4 million EUR) (Duda 2006). Similar to the commercial NPPs, this estimate covers all decommissioning activities, which UJV Rez is required to outline in the decommissioning documentation it must submit to SUJB as a condition of licensing.

The cost assessment is based on the same methodology applied by the commercial NPPs (undiscounted costs based on current price basis). UJV Rez is also obliged to revise its cost estimates every five years and the respective figures (on which the funding methodology is based on, see section 3.1.1) must be approved by RAWRA.

Unlike in the case of CEZ, the cost estimates are done by the in-house experts of UJV Rez.

Interim Storage facilities Dukovany/ Temelin (in the planning stage)

Currently, costs for decommissioning ISFSF and SFSF are estimated to be 12,2 million CZK (430.000 EUR, 2004 price level) and 12,4 million CZK (435.000 EUR, 2005 price level) respectively (Davidova 2006). This figure has been determined by applying the identical methodology as for the nuclear reactors. Update requirements and frequency (five years) is also the same (Duda 2006).

Dukovany Radioactive Waste Repository

The costs for closing of the Dukovany waste repository are expected to be 912 million CZK (23 million EUR) for decontamination of equipment, dismantling, demolition, terrain work, physical protection, and 300 years of monitoring. The estimate includes a 20% reserve (Duda 2006). The same methodology, cost basis, approval procedure, and regular review requirements are applied as for all other nuclear facilities. The cost estimate for the waste repository is part of the decommissioning documentation for the operation licence.

Planned deep geological final disposal:

The estimated total costs from 1999 to the termination of the deep geological disposal are estimated to amount to 46,9 billion CZK (1,65 million EUR). They can be distributed among the different commissioning stages as follows (RAWRA 2006):

- Research & development: 5,2 billion CZK (183 million EUR)
- Initiation and planning phase: 0,8 billion CZK (28 million EUR)
- Construction: 17,5 billion CZK (616 million EUR)
- Operation: 23,1 billion CZK (812 million EUR)
- Termination: 0,3 billion CZK (11 million EUR)

Table 2 Expected total costs of future decommissioning of nuclear installations in the Czech Republic (in prices of 2004)

Short name of nuclear facility	**Kind of facility:** **NPP = nuclear power plant** **RR = Research reactors** **Others: please specify**	**Years decommissioning activities are expected to take place**	**Total decommissioning costs estimated [Mio. EUR]**	**Annuity of estimated decommissioning costs in relation to output over lifetime [ct/kWh for NPP; 4%]**	**Remarks**
Dukovany 1-4	NPP	2022-2086	580	0,05	Anticipated total lifetime of 40 years (this extension is currently under discussion); cost estimates cover only technical decommissioning activities
Temelin 1-2	NPP	2047-2091	480	0,04	Anticipated total lifetime of 40 years; cost estimates cover only technical decommissioning activities
LVR-15	RR	2018-2031	4,4		Cost estimates cover only technical decommissioning activities
ISFSF Dukovany	Interim storage for spent fuel (dry surface storage)	2070	0,3		Cost estimates cover only technical decommissioning activities
Repository Dukovany	Radioactive waste repository (above ground)	2100	23		No decommissioning in a narrow sense (as site won't be released out of the scope of the Atomic Act after closure)

Source: Duda (2004), Duda (2006), Pazdera (2006), Davidova (2006)

3 Funds and fund management

3.1 Setting aside funds

The main principles of allocating the costs for nuclear waste management are laid down in the Atomic Act and strictly follows the Polluter Pays Principle: An owner of radioactive waste or other natural person or legal person managing the assets of an owner in such a manner that radioactive waste is generated shall bear all costs associated with its management, from its time of origin to its disposal, including monitoring of radioactive waste repositories after their closure, and including the necessary research and development activities. A contractual transfer of rights to manage radioactive waste or of its ownership is possible but must be stipulated in writing (Section 24 para. 2 Atomic Act).

3.1.1 Decommissioning reserves in blocked accounts

With its implementation in 1997 the Atomic Act obliged operators of nuclear facilities to steadily make financial provisions for the costs covering the technical decommissioning of nuclear installations, so that financial resources will be available for preparation and performing of decommissioning, at the required time and in the required amount, in accordance with the programme of decommissioning approved by SUJB. The requirement applies to all facilities for which an estimate of total decommissioning costs approved by RAWRA exceeded 300.000 CZK (10.600 EUR). The required financial means for decommissioning activities must be available at the beginning of each particular stage of decommissioning.

As this funding methodology was considered inadequately secure (e.g., in the case of a licensee’s bankruptcy) the Atomic Act was revised in 2002. Licensees of nuclear installations with decommissioning cost estimates exceeding the above level are now compelled to make annual payments, which are deposited on a blocked account. For those companies, which already had built provisions for decommissioning of their nuclear facilities under the former regulation a transition, period of five years (ending 2007) was granted in which they must transfer the respective internal decommissioning reserves to a blocked account in accordance with the Atomic Act (see section 3.1.3).

All interest earned on the balance within a blocked account must be retained as income to that blocked account. Blocked accounts are kept by the operator, but all funds in the blocked accounts may only be used for the preparation and implementation of decommissioning, and any drawing on the funds in the blocked accounts must be approved by RAWRA. In this sense the blocked accounts can be classified as internally managed segregated funds with all assets being earmarked for decommissioning purposes. It should be noted that liabilities resulting from spent fuel management (e.g., costs for on-site interim storage) and all costs related to final nuclear waste disposal are not covered by this funding methodology, but are subject to funding through the Nuclear Account (see section 3.1.2).

The obligation to make provision for decommissioning does not apply to organisational units of the state, state-subsidised organisations, public universities, and any organisational bodies or subsidised organisations established by territorial self-governing units.

Further legal requirements for making financial provision are detailed in the Ministry of Industry and Trade's Decree 360/2002 Coll.[10] Among other things, the decree requires that the collection of decommissioning funds commence with the start-up of the respective nuclear installation, and that a straight-line method of fund accumulation over the lifetime of the facility be used to ensure that all funds required for decommissioning are available by the time of decommissioning.

The requirement to establish and continuously contribute to a blocked account applies to CEZ for decommissioning its NPPs and on-site interim storage facilities, and to UJV Rez for decommissioning its research reactors and its nuclear waste storage facilities. However, not all activities linked to the decommissioning of these facilities will be financed from the reserves set aside in the blocked accounts. Blocked accounts cover only the costs for technical decommissioning works (e.g. decontamination, dismantling, part of the radioactive waste management until radioactive waste is classified as such and ownership of the waste is transferred to RAWRA). Final disposal of HLW/ILW/LLW stemming from decommissioning activities and other waste management and storage costs of RAWRA after having gained ownership of the waste will be paid for from the Nuclear Account (see section 3.1.2).

The basis for setting up the accruals to the blocked accounts are undiscounted decommissioning costs based on decommissioning cost estimates in prices in the year when the estimation was made (see section 2.2.5) (Decree 185/2003 Coll., Duda 2004). The annual accruals are tax deductible. Since the Czech electricity market has been fully liberalised in 2006, CEZ must cover the respective expenditures from its normal business.

In order to regularly adapt the annual contributions in case of a change of cost estimates, obliged licensees must update their decommissioning plans and cost estimates every five years (see section 2.2.4). Within this update, an adaptation of the annual accrual to the blocked accounts is done. The determination of the new annual provision is based on the updated estimate of total costs, the already created financial resources in the blocked account, and the number of years remaining to the presumed termination of the nuclear facility in question.

According to SUJB, the statutory reserve for the decommissioning of NPPs Dukovany 1-4 as created by CEZ amounts to 155 million CZK (5,5 million EUR) per year. The provision for the decommissioning of NPPs Temelin 1-2 amounts to 153 million CZK (5,4 million EUR) per year. And the annual accrual for the decommissioning of ISFSF is 116.000 CZK (4.100 EUR) (SUJB 2005).

As of 31 December 2004, CEZ had transferred a total of 1.58 billion CZK (56 million EUR) to its blocked account. Of this total, 993 million CZK (35 million EUR)

[10] Decree of Ministry of Industry and Trade establishing a method to create a provision for decommissioning of nuclear installations and workplaces in categories III or IV 360/2002 Coll. of 19 July 2002

is for NPPs Dukovany 1-4, 587 million CZK (21 million EUR) for NPPs Temelin 1-2, and 360.000 CZK (12.500 EUR) for ISFSF Dukovany (SUJB 2005).

By 31.12.2004 UJV Rez has made provisions of approx. 1,7 million CZK (60.000 EUR) to a blocked account for decommissioning the research reactor LVR-15 and 64.200 CZK (2.300 EUR) for decommissioning its storage facilities (Duda 2006).

3.1.2 Decommissioning funding through the Nuclear Account

RAWRA is the regulatory agency responsible for the proper storage and disposal of radioactive waste and is also the sole owner of waste repositories in the country. In this respect, RAWRA must accept radioactive waste from a generator in the event that the waste meets acceptance criteria (established by SUJB) for waste disposal. On the date RAWRA accepts radioactive waste from its generator, the waste passes into the ownership of the State (section 31 Atomic Act).

The activities of RAWRA are financed from the so-called Nuclear Account, an interest-bearing account opened with the Czech National Bank. The Nuclear Account is managed by the Ministry of Finance and is included among the accounts of State financial assets and liabilities, the utilisation of which is decided by the national government. Resources in the Nuclear Account may only be used for purposes related to the management of nuclear waste (section 26 para. 2 Atomic Act).

The income to the Nuclear Account mainly comprises payments from radioactive waste generators. CEZ and UJV Rez are thus obliged to make financial provisions adequate to cover the disposal of their radioactive waste and for the associated activities of RAWRA. The respective financial resources are accumulated in the Nuclear Account in the form of payments (section 27 para. 2 Atomic Act) which are tax deductible. Interest and investment revenues (see section 3.2.2) are income to this account (section 27 para. 1 Atomic Act).

Among other things, the obligation to pay into the Nuclear Account applies to:

- the disposal of the LLW/ILW from NPP operation (Repository Dukovany) and LVR-15 operation (Repository Richard),
- final disposal of the spent fuel of NPPs and research reactors, and
- final disposal of the LLW/ILW/HLW decommissioning waste of NPPs and research reactors.

The amount and method of payments to the Nuclear Account, especially the payment basis, payment rate, payment period, payment due, submission of a payment return form and payment advances, together with the manner of their administration, including the way payer records are kept, and details of Nuclear Account management have been originally set by the governmental resolution 224/1997 Coll. (Government Resolution on the amount and terms of payments to the Nuclear Account by radioactive waste producers of 13 August 1997) which was replaced by the resolution 416/2002 Coll. in 2002.[11]

According to Resolution 416/2002 the basis for a payment from CEZ for the operation of NPPs Dukovany 1-4 and NPPs Temelin 1-2 is the mean annual production of electricity measured at the output of the generator.[12] The rate of payment for these six NPPs amounts to 50 CZK (1,8 EUR) for each MWh produced.

UJV Rez has to pay 15 CZK (0,5 EUR) per MWh heat produced in its research reactors. The lower specific rate corresponds to the ratio of the thermal to the electric output of a power plant. Whereas the rate valid for CEZ covers all waste management activities performed by RAWRA associated to CEZ, the rate paid by UJV Rez covers only final disposal of spent fuel. All other waste management activities of RAWRA by order of UJV Rez are paid per activity (for instance a specific fee incurs per waste drum delivered to a repository) (Duda 2006). All payments have to be made monthly in advance.

The specific rate to be paid to the Nuclear Account set forth through Resolution 416/2002 was determined by RAWRA, which is also responsible for its regular verification. In view of cost increases, the rate might be adapted in future. Each adaptation would require a new resolution (Duda 2006). Furthermore the specific payment rate encounters all costs related to nuclear waste management activities that occurred prior to 1997, the year in which the Nuclear Account was established.

The cost basis for the payment rate shall comprise all actual and expected future costs related to waste management (including construction and operation of the planned deep geological final disposal). All future cost items have been distributed according to the expected total number of kilowatt-hours generated in the NPPs. Cost estimates for the planned final disposal site are based on RAWRA's estimates and corresponding reference values used in other countries (e.g. Finland). According to RAWRA, the estimates used are close in absolute terms to estimates in other countries (Duda 2006).

When determining the specific payment rate, the following items are taken into account:

- discounted estimated waste treatment and waste storage costs,
- a schedule when which costs are expected to occur (time horizon until 2100 + 300 year monitoring period for final disposal site),
- a schedule for electricity generation of the NPPs, and
- all expected revenues from investments through the Nuclear Account (Duda 2006).

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11 In addition to the listed regulations, Resolution 416/2002 establishes an annual amount of, and rules for providing, contributions to municipalities on whose cadastral areas radioactive waste repositories are located. Respective municipalities are entitled to request a maximum of 1 million CZK (35.000 EUR) per year after approval by the government.

12 Before 2003 (in accordance with resolution 224/197 Coll.) CEZ has made regular payments to the nuclear account based on its average nuclear MWh generated during the last 5 years.

According to RAWRA, CEZ contributed 1,3 billion CZK (46 million EUR) to the Nuclear Account in 2004, while the yearly contribution made by the UJV Rez was 495.000 CZK (17.500 EUR) (RAWRA 2005). According to SUJB, CEZ had paid about 6 billion CZK (210 million EUR) to the nuclear account by the end of 2004 (SUJB 2005).

3.1.3 Internal nuclear provisions of CEZ and UJV Rez

CEZ, as a company publicly traded on the stock exchange, is required to report its financial statements in accordance with International Financial Reporting Standards (IFRS). Therefore the reported internal provisions for its liabilities for decommissioning and nuclear waste management (see section 3.1.1) are calculated and reported based on International Accounting Standard (IAS) 37 principles.

The provisions are built for decommissioning CEZ's NPPs, to store the related spent nuclear fuel on an interim basis and for its obligation to provide financing for subsequent permanent storage of spent fuel and irradiated parts of reactors. As of 31.12.2004 CEZ reports internal provisions for technical decommissioning of its six NPPs of 9,1 billion CZK (321 million EUR). Accumulated provisions for spent fuel management amounted to 20,3 billion EUR (714 million EUR) (CEZ 2005).

The provisions are based on internal CEZ cost estimates of the expenditures required to settle the present obligation at the current balance sheet date. The respective cost estimates are based on current price levels (at the date the estimate was done) and are discounted using an annual real rate of interest of 2,5%. Each year, the provisions to the internal reserves are increased to reflect the accretion of discount and to accrue an estimate for the effects of inflation. An annual inflation rate of 4,5% is anticipated based on the current rate of interest on long-term Czech government bonds of approximately 7% and the estimated 2,5% real rate of interest (CEZ 2005).

It should be noted that there is no requirement that funds equal to the financial provision be invested in secure investments such as state-guaranteed bonds (Duda 2006).

Revised legislation requires CEZ to transfer its provisions for technical decommissioning costs accumulated since 1997 (when the Atomic Act came into force) to a blocked account within a transition period of five years (see section 3.1.1). All provisions created since 1997 have the status of a statutory reserve for decommissioning (Davidova 2006). According to SUJB CEZ had – between 1997 and the end of 2004 – created internal provisions for technical decommissioning activities of 4,7 billion CZK (165 million EUR) from which the decommissioning provision was 3,9 billion CZK (137 million EUR) for NPPs Dukovany 1-4, 798 million CZK (28 million EUR) for NPPs Temelín 1-2 and 522.000 CZK (18.400 EUR) for ISFSF Dukovany (SUJB 2005). By the end of 2007 these provisions must have completely been transferred to the blocked accounts.

According to RAWRA UJV Rez's internal provisions for decommissioning of LVR-15 amounted to 70 million CZK (2,5 million EUR) as of 31.12.2004 (Duda 2006).

3.2 Management of funds

3.2.1 Management of reserves in blocked accounts

Legal ownership of the blocked accounts stays with CEZ (for decommissioning reserves for NPPs Dukovany and Temelin) and UJV Rez (decommissioning reserves for research reactors) and both companies manage the respective accounts internally (Duda 2004). Financial means may only be withdrawn from the blocked accounts for decommissioning purposes and after RAWRA's approval. Interest from the blocked accounts is income to this account (see section 3.1.1). Since the blocked accounts are managed with a bank and there is the legal obligation that all financial means transferred to the blocked accounts must be available, there seems to be no real investment strategy for the funds and persistent liquidity should be ensured. Blocked accounts function as savings accounts with fixed rates of interest. Interest rates of the blocked accounts are standard bank interest rates, which are currently very low (Davidova 2006).

There are not any requirements for independent third-party financial audits of the blocked accounts apart from the annual reviews carried out by RAWRA. The results of the reviews are reported to SUJB. The annual reviews include an evaluation of whether sufficient reserves will be available to cover the whole decommissioning programme. The bases for the review are the decommissioning plans submitted to SUJB by CEZ and UJV Rez, which have to be updated at least every five years. Apart from this, those banks which manage the blocked accounts on behalf of CEZ and UJV Rez report to RAWRA about the financial volumes transferred to the respective accounts. RAWRA is also entitled to review the contracts between the obliged companies and their banks.

3.2.2 Management of the Nuclear Account

The Nuclear Account is managed by the Ministry of Finance. In accordance with the Atomic Act, the balance of the Nuclear Account run as State financial assets may be invested on the financial market, but only in liquid government bonds, bonds of the Czech National Bank, State guaranteed bonds, or in securities of issuers whose rating level granted by a rating agency selected by the Ministry of Finance is at least as good as that of the Czech Republic. The Ministry of Finance is entitled to carry out financial investment through the intermediary of other persons. The manner of investment and its profitability are supervised by the Ministry (section 27 para. 4 Atomic Act). RAWRA takes no active role in this regard. In 2004, the total gross return on investments of funds in the Nuclear Account on the financial market amounted to 119,7 million CZK (4,21 million EUR) (RAWRA 2005).

3.2.3 Management of internal nuclear provisions of CEZ and UJV Rez

Any financial reserves which represent these internal provisions are managed internally by the companies. There exist no legal requirements concerning the security level or liquidity of these funds. As mentioned in section 3.1.3, CEZ and UJV Rez aren't even obliged to make highly secure investments (such as state guaranteed bonds) equivalent to the total amount of the provisions. Provisions reported with the financial statements of the companies concerned serve only as an instrument for investors to quantify the influence of future decommissioning liabilities on the companies' income and accounts (Davidova 2006).

No information is available regarding how the companies in question invest the financial means, which stand behind the provisions reported in the accounting documents. Independent control of any form of investments reflecting these internal nuclear provisions is not foreseen.

3.3 Special cases: Fall-back option and transfer of ownership

3.3.1 Blocked accounts

CEZ and UJV Rez are obliged by law to bear all the decommissioning and nuclear waste management costs stemming from their nuclear activities. In the case of early and unforeseen shut down of one of the NPPs or research reactors, the originally planned method of decommissioning shall be re-evaluated and the documentation, with regard to such facts, shall be up-dated and financial requirements re-evaluated (Duda 2004). In practice, this means that the respective plant operator would be required to transfer money to the blocked account according to the decommissioning documentation, which is an integral part of the operation licence of a nuclear facility.

Also in those cases where it might turn out (at the time of decommissioning) that the financial means transferred to the blocked accounts are not sufficient to cover all costs related to the respective activities, the plant operator would be required to bear all remaining costs.

In case the operator of a nuclear reactor goes bankrupt, all financial reserves placed in the blocked accounts would be available to compensate for decommissioning and related costs. If these reserves are not sufficient, the government (which would then take the role of a creditor) could try to obtain compensation for at least parts of the remaining decommissioning activities through participation in the normal bankruptcy proceedings. However, the government would be regarded as normal creditor with no preferred rights. In the worst case, the taxpayer would be required to bear all remaining costs.

The regular reviews of cost estimates are intended to reduce financial risks associated with bankruptcy or inadequate financial provisions (see section 3.1.1). Provided that those companies that are obliged to establish blocked accounts or their legal successors will still exist at the time decommissioning works commence, at least that much financial reserves should be available which corresponds to the most current decommissioning cost estimate at this point in time.

No company is obliged to take out insurance to cover financial risks related to the risk scenarios outlined above (Duda 2006).

3.3.2 Nuclear Account

The principle of the Czech nuclear policy that generators of nuclear waste have to bear all waste management costs resulting from their nuclear activities is in principle applied until all activities have been finalised and paid off. In this regard, RAWRA is regularly re-evaluating the payment rates the annual contributions of CEZ and UJV Rez to the Nuclear Account are based on (see section 3.1.2). RAWRA might also adapt the respective rates when a nuclear power plant has already been shut down. In this case, the rate a nuclear power plant operator would have to pay would change to an annual contribution (instead of being related to the power or heat output of the respective power plant).

The main financial risk for the Nuclear Account results from a potential bankruptcy of the contributors to the Nuclear Account. In this case, the remaining costs that can not be covered by the existing means in the Nuclear Account would have to be compensated for by the taxpayer.

3.3.3 Internal nuclear provisions of CEZ and UJV Rez

The main reason for changing legislation towards the establishment of blocked accounts was the judgement that purely internal provisions do not represent an appropriate methodology for ensuring that secure funding exists for handling nuclear liabilities. For that reason, legislation was changed in 2002 to require companies to transfer existing provisions (within a transition period) to a blocked account (see section 3.1.1). The transition period will end in 2007. As of this date, risks from the currently existing provision scheme should mainly be limited to the risk scenarios related to the blocked accounts (see section 3.3.1) and Nuclear Account (see section 3.3.2). However, since for NPP Dukovany all provisions created before 1997 (date the Atomic Act came into force) are not required to be transferred to the blocked account of CEZ the risk remains that adequate funding for decommissioning of this NPP might be missing when the dismantling of the four reactors is due.

Table 3 Base for decommissioning funds required

Short name of nuclear facility	Kind of facility: NPP = nuclear power plant RR = Research reactors Others: please specify	Please check if decommissioning funds are based on overnight / undiscounted decommissioning costs	Please check if decommissioning funds are based on net present value / discounted decommissioning costs	Discount rate used for discounting, if any	Reference date used for discounting	Remarks
Dukovany 1-4	NPP	undiscounted				Information in column C refers to the funding methodology for technical decommissioning activities (e.g. decontamination, dismantling…) since 1997. Costs for waste management/waste treatment (e.g. final disposal of all kind of radioactive waste from operation and decommissioning) taken over by RAWRA and financed through the Nuclear Account are based on discounted costs.
Temelin 1-2	NPP	undiscounted				Same as above
LVR-15	RR	undiscounted				Same as above
ISFSF Dukovany	Interim storage for spent fuel (dry surface storage)	undiscounted				Same as above
Repository Dukovany	Radioactive waste repository (above ground)		discounted	?		Expected time schedule of different decommissioning activities is taken into account.

Source: Duda (2004), Duda (2006), Decree 185/2003 Coll.

Table 4 Decommissioning funds accumulated in relation to expected total costs of future decommissioning of nuclear installations in the Czech Republic (in prices of 2004)

Short name of nuclear facility	**Kind of facility:** **NPP = nuclear power plant** **RR = Research reactors** **Others: please specify**	**Total decommissioning costs estimated [Mio. EUR]**	**Provisions accumulated by 31-12-2004 [Mio. EUR]**	**Provisions accumulated in relation to expected costs [%]**	**Years of operation until 31-12-2004 in relation to total expected lifetime [%]**	**Remarks**
Dokovany 1-4	NPP	580	137	24%	48%	Start of operation of NPPD1-4 between 1985 and1987; anticipated lifetime 40 years. Column C refers to costs for technical decommissioning activities (e.g. decontamination, dismantling…) only. Column D refers to provisions accumulated since 1997 only.
Temelin 1-2	NPP	480	28	6%	10%	Start of operation of NPPT1 in 2000 and NPPT2 in 2002; anticipated lifetime 40 years. Columns C/D same as above
LVR-15	RR	4,4	2,5	55%	61,5%	Start of operation after major reconstruction work in 1989; anticipated shut down date 2014. Column C same as above
ISFSF Dukovany	Interim storage for spent fuel (dry surface storage)	0,4	0,018	4%	11%	Date of commissioning 1997; anticipated closing date 2070
Repository Dukovany	Radioactive waste repository (above ground)	23				Date of commissioning 1997; anticipated closing date 2100; closing costs will be covered by the Nuclear Account

Waste Management activities by RAWRA (Nuclear Account)		1.490 (own estimate for NPPD and NPPT)	211	14%		Columns C/D/E do only reflect figures for CEZ. The estimates are based on expected total electricity generation between 1997 and expected date of shut down of NPPD and NPPT (anticipated lifetime 40 years) and the current specific contribution to the Nuclear Account of 50 CZK/MWh

Source: Duda (2004), Duda (2006), Davidova (2006)

Table 5 Management of decommissioning funds in the Czech Republic

Short name of nuclear facility	**Kind of facility:** **NPP = nuclear power plant** **RR = Research reactors** **Others: please specify**	**Provisions accumulated by 31-12-2004 [Mio. EUR]**	**… of which has been accumulated within the own assets of the operator of the facility or its mother company [Mio. EUR]**	**… of which has been accumulated by the operator of the facility or its mother company within a separated account / segregated fund [Mio. EUR]**	**… of which has been accumulated in an external fund under public control [Mio. EUR]**	**… of which has been accumulated in an external fund under mixed private-public control [Mio. EUR]**	**Share of funds the operator of the facility can access for other activities until the funds are needed for their original decommissioning purpose [%]**	**Remarks**
Dukovany 1-4	NPP	137	101,7	34,9			74%	Internal provisions created since 1997 for technical decommissioning must be transferred to a blocked account by 2007; Column C refers to costs for technical decommissioning activities (e.g. decontamination, dismantling…) only. Columns D/H refer to provisions accumulated since 1997 only.
Temelin 1-2	NPP	28	7,4	20,7			26%	same as above
LVR-15	RR	2,5	2,44	0,06			98%	same as above
ISFSF Dukovany	Interim storage for spent fuel (dry surface storage)	0,018	0,006	0,0126			31%	same as above
Repository Dukovany	Radioactive waste repository (above ground)							Closing costs will be covered by the Nuclear Account

Waste Management activities by RAWRA (Nuclear Account)		211			211			Columns C/F do only reflect figures for CEZ

Source: SUJB (2005)

Table 6 Investment of decommissioning funds until they are used for their original purpose

Short name of nuclear facility	**Kind of facility:** **NPP = nuclear power plant** **RR = Research reactors** **Others: please specify**	**Provisions accumulated by 31-12-2004 [Mio. EUR]**	**… of which have been invested in secure state bonds [Mio. EUR]**	**… of which have been invested in other assets with fixed interest rates [Mio. EUR]**	**… of which have been lent to associated or joined companies or to third parties [Mio. EUR]**	**… of which have been invested in other means (shares, mergers & acquisitions, etc.) [Mio. EUR]**	**Interest on invested financial means from decommissioning funds in 2004 [%]**	**Interest on invested financial means from decommissioning funds in period 2000-2004 [%]**	**Remarks**
Dukovany 1-4	NPP	137		34,9 (blocked account)	?	?	NA	NA	Column C refers to costs for technical decommissioning activities (e.g. decontamination, dismantling,…) only. Columns C/E/G refer to provisions accumulated since 1997 only.
Temelin 1-2	NPP	28		20,7 (blocked account	?	?	NA	NA	same as above
LVR-15	RR	2,5		0,06 (blocked account	?	?	NA	NA	same as above

ISFSF Dukovany	Interim storage for spent fuel (dry surface storage)	0,018		0,0126 (blocked account	?	?	NA	NA	
Repository Dukovany	Radioactive waste repository (above ground)								Closing costs will be covered by the Nuclear Account
Waste Management activities by RAWRA (Nuclear Account)		211	211				2%		Columns C/D/H do only reflect figures for CEZ

Source: SUJB (2005), Duda (2006)

4 Transparency of the funding schemes to the public

The responsibility of informing the public about the decommissioning strategies for all nuclear facilities (including the strategies for the management of all nuclear waste deriving from the operation the respective installations as well as from decommissioning) lies with the operators respectively owners of the installations in question. This mainly concerns CEZ (as the owner of the commercial NPPs Dukovany 1-4 and Temelin 1-2), UJV Rez (as the owner of the research reactors LVR-15 and LR-0 as well as all waste management and storage facilities located at UJV Rez) and RAWRA (as the operator of all waste disposal facilities and nuclear waste once it has been formally classified as such) (Duda 2006).

The respective information about the different decommissioning strategies is made public through different publications provided by the mentioned companies, in particular RAWRA. Apart from this, SUJB and RAWRA are required by Czech law to provide information in response to queries from the public regarding decommissioning strategies and costs (Duda 2006). The distribution of the responsibility for decommissioning is laid down in the Atomic Act and subsequent legislation. Thus the distribution of liabilities can be regarded as quite transparent to the public.

In contrast, the amount of public information about decommissioning cost estimates is quite low. No comprehensive documentation was found for any installation about the exact methodology applied for estimating its total decommissioning costs. Cost breakdowns by decommissioning activity are also unavailable.

The main structure and principles of the three decommissioning funding schemes (blocked accounts, Nuclear Account, and internal provisions) are set forth by the legal framework, which is transparent to the public. Although there is no comprehensive reporting scheme specifically focussing on decommissioning funding, several publications available to a broader public do report regularly about the respective funds. The transparency of the specific decommissioning funding schemes is as follows:

- **Blocked accounts:** The latest figures about the disposable assets allocated to the blocked accounts of CEZ and UJV Rez are published in the annual financial statement of these companies and can be found in regular reports provided by SUJB (e.g., SUJB 2005).
- **Nuclear Account:** Up-to-date figures about the Nuclear Account are disseminated by RAWRA through its annual report. Here it is also made public how much revenue was gained by investing the disposable funds on the financial market.
- **Internal nuclear provisions of CEZ and UJV Rez:** Up-to-date figures about the internal provisions built by the two companies can also be found in their annual financial statements. However, from this reporting scheme it is not possible to find out in which forms of investment the respective provisions have been invested. Such information would be required to allow the public to evaluate whether this methodology for securing the funding of future nuclear liabilities is appropriate and reliable.

Legislation does not foresee any public participation in the decision process on decommissioning funding.

5 Stakeholder analysis

Several institutions and companies are directly involved in activities related to the topic of decommissioning funding. The main stakeholders from the commercial sector are CEZ and UJV Rez. From the administrative side, the State Office of Nuclear Safety (SUJB) and the Radioactive Waste Repository Authority (RAWRA) are the key authorities involved in activities related to decommissioning. The government is involved in this issue in particular through the Ministry of Industry and Trade and the Ministry of Finance. The specific role of these stakeholders in the decommissioning funding scheme has been described in detail throughout this report.

In addition, several environmental NGOs work on issues related to decommissioning funding. This applies especially to the citizens' environmental association Calla and the Czech office of Greenpeace.

5.1 Government and related Authorities (Institutional Stakeholders)

5.1.1 Radioactive Waste Repository Authority (RAWRA)

RAWRA considers the existing financing scheme an appropriate instrument to secure long-term decommissioning funds. RAWRA regards as sufficient both the underlying methodology for estimating future decommissioning costs as well as the respective requirements for public control of estimated costs. The transparency of the scheme to the public is also regarded as sufficient.

Although RAWRA regards the Czech scheme to be very safe, the requirement to transfer financial means to segregated funds is regarded as too strict. The blocked accounts are outside the control of the account owners, which means that these companies have no access to this money apart from the purpose of decommissioning. This requirement is seen by RAWRA as too large a restriction on the flexibility of the companies, in particular CEZ. It is also seen as market discrimination against CEZ since electricity companies in other EU Member States (e.g. Germany) have full access to the respective funds.

RAWRA has no proposed changes to existing legislation and will not initiate any, believing such initiatives to be the purview of the elected authorities.

Harmonisation of decommissioning funding methodologies throughout EU Member States would in general be welcomed by RAWRA. However, this attitude is driven primarily by a desire to remove market-distorting conditions and not by a desire to secure safer decommissioning funds in all Member States. In its position to the EC recommendations for the management of financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste, the Czech government stated that it believed the external ring-fenced funds proposed by the Commission were overly strict and unnecessary and that (rather than independent management of financial resources as stated by the draft Directive) only safe or secure management of the financial resources should be asked for. In this respect the Czech government argued that safe decommissioning could also be achieved without an accumulation of earmarked funds prior to decommissioning (Czech Republic 2002).

Furthermore the Czech government recommended to define the term decommissioning as not to include spent fuel disposal but rather to distinguish between funds for decommissioning and spent fuel management (disposal). As a consequence two different financial arrangements might be required to cover the back end costs of nuclear facilities.

5.2 Commercial stakeholders

5.2.1 CEZ

CEZ finds that the existing national laws and regulations are adequate and has no proposals to make changes to these rules. Regarding potential EU legislation, the position of CEZ is that the issue of transparency should be the focus of any legislation on decommissioning funding (Davidova 2006).

5.2.2 UJV Rez

UJV Rez shares the view of the Czech government. The methodology for decommissioning funding is regarded as appropriate, however the requirement to establish blocked accounts is seen as too strict (see RAWRA above). Harmonisation across the EU Member States would be welcomed (Pazdera 2006).

5.3 Non Governmental Groups

5.3.1 Calla

Calla – Association for Preservation of the Environment – is an environmental group focusing on protecting the environment, conserving the natural ecosystems of southern Bohemia, and promoting the use of renewable energy. Calla criticizes current Czech decommissioning law mainly for its lack of transparency and the fact that funds for technical decommissioning (blocked accounts) are not held in a publicly owned external account.

According to Calla, there is too little transparency into the costs of decommissioning. It is not possible for the public to get important information regarding the decommissioning costs and the regulatory oversight of funds. Calla finds that the methodology used by government regulators to review nuclear operators' cost estimates is also inadequately explained to the public.

Calla also questions whether the nuclear regulators are adequately independent from industry, stating that circumstantial evidence supports the idea that SUJB is making decisions to the benefit of CEZ. Calla also claims that RAWRA oversight of the use of decommissioning funds is inadequate, with funds being used without a detailed investigation into the intended use and the explicit approval for that use, as called for under Czech law.

Compared to the use of external accounts in public ownership, the current system offers insufficient independent control of the accounts, according to Calla. This increases the risk that decommissioning funds may be inadequate or sustain losses. Prior to the 2002 changes to Czech law regarding decommissioning funding, Calla pressed for legislation requiring the creation of an external decommissioning account outside the ownership of nuclear operators. Calla's proposal was not adopted in the final legislation. In recent years, Calla has focused on the issue of increased public participation in the siting of new nuclear facilities.

Calla welcomes EU legislation harmonising decommissioning funding in the Member States.

6 Conclusions and recommendations

The Czech Republic seems to be employing a reasonable method of securing funds for decommissioning activities and the management of nuclear waste. The blocked accounts as well as the Nuclear Account are appropriate instruments that provide a maximum of funding security. In particular, the establishment in 2002 of segregated decommissioning funds (blocked accounts) for the costs of technical decommissioning that are subject to regular public oversight by RAWRA is to be welcomed.

However this report does not analyse whether the annual contributions toward the blocked accounts and the Nuclear Account are appropriate, nor whether sufficient funds have been set aside so far. Such an analysis would require a detailed audit of both the cost parameters and estimation methods used to forecast such costs, and is outside the scope of this study. Unfortunately transparency beyond aggregated results for cost estimates is quite low for the time being. Enhanced transparency regarding cost-estimation data and its analysis would increase the ability of citizens and experts to assess whether adequate funds are being collected in the Czech Republic.

An additional instrument that can enhance the security of decommissioning funding schemes is to introduce a system in which nuclear licensees are obliged to assume joint liability for decommissioning costs and nuclear waste management. However, in the case of the Czech Republic, such an approach would not represent a real improvement for the time being. This is because current nuclear liabilities are unevenly distributed among the licensees, with CEZ being the company with the preponderance of the liability. Were CEZ not able to pay for its nuclear liabilities, a smaller entity such as UJV Rez would not be capable of assuming CEZ’s costs. Should the ownership structure in the Czech Republic reach a sufficient level of diversification, then a joint-liability approach should be considered to minimize the risk that taxpayers must assume the nuclear liabilities of a bankrupt licensee.

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Annexes

Act No. 18/1997 Coll. of 24 January 1997 on Peaceful Utilisation of Nuclear Energy and Ionising Radiation (the Atomic Act) amended by Act No. 13/2002 Coll. and Act No. 310/2002 Coll.

CEZ Annual Report 2004

Czech Republic 2002: The Czech Republic's position on the EC recommendation for the management of financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste.

Decree 185/2003 Coll. of the State Office for Nuclear Safety of June 3, 2003 on decommissioning of nuclear installation or category III or IV workplace

SUJB (State Office for Nuclear Safety) 2003, 2005: National Report under the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

ACT No. 18/1997 Coll.

of 24 January 1997

on Peaceful Utilisation of Nuclear Energy and Ionising Radiation (the Atomic Act) and on Amendments and Alterations to Some Acts

As amended by:
Act No. 83/1998 Coll.
Act No. 71/2000 Coll.
Act No. 132/2000 Coll.
Act No. 13/2002 Coll.
Act No. 310/2002 Coll.
Act No. 320/2002 Coll.

The Parliament has passed this Act of the Czech Republic:

PART I

PEACEFUL UTILISATION OF NUCLEAR ENERGY AND IONISING RADIATION

CHAPTER ONE
INTRODUCTORY PROVISIONS

Section 1
Scope

This Act regulates:

a) the method of utilising nuclear energy and ionising radiation, and conditions for the performance of practices related to nuclear energy utilisation and radiation activities;

b) the system for protection of people and the environment from undesirable effects of ionising radiation;

c) obligations during preparation for and implementation of intervention intended to reduce exposures to natural sources and exposures due to radiation accidents;

d) specific requirements for civil liability in the case of nuclear damage,

e) conditions for safe management of radioactive waste;

f) performance of State administration and supervision within nuclear energy utilisation, within radiation activities and over nuclear items.

Section 2
Basic Terms

For the purposes of this Act

a) activity related to nuclear energy utilisation means

1. the siting, construction, commissioning, operation, reconstruction and decommissioning of nuclear installations;
2. designing nuclear installations;
3. designing, manufacturing, repairs and verification of nuclear installation systems or their components, including materials used for their production;
4. designing, manufacturing, repairs and verification of packaging assemblies for the transport, storage or disposal of nuclear materials;
5. handling of nuclear materials and of selected items and, in the case of their use in the nuclear field, also of items of dual use;
6. research and development into the activities mentioned in points 1 to 5;
7. professional training of personnel, specialised from the nuclear safety viewpoint for the activities stated under point 1;
8. transport of nuclear materials;

b) radiation activity means

1. radiation practice which involves
   aa) an activity that may increase the exposure of individuals to radiation from an artificial sources of ionising radiation, except activity in the case of radiological emergency, or
   bb) an activity in which natural radionuclides are used for their radioactive, fissile or fertile properties;
2. a work activity associated with the increased presence of natural radionuclides or increased influence of cosmic radiation and lead or may lead to a significant increase in exposure of individuals;

c) ionising radiation source means a substance, equipment or installation capable of emitting ionising radiation or releasing radioactive substances;

d) nuclear safety means the condition and ability of a nuclear installation and its servicing personnel to prevent the uncontrolled development of a fission chain reaction or an inadmissible release of radioactive substances or ionising radiation into the environment, and to reduce the consequences of accidents;

e) radiation protection means a system of technical and organisational measures to reduce exposure of individuals and to protect the environment;

f) physical protection means a system of technical and organisational measures preventing unauthorised activities with nuclear installations, nuclear materials and selected items;

g) emergency preparedness means an ability to recognise the occurrence of a radiological emergency and, upon its occurrence, to carry out measures specified in emergency plans;

h) nuclear installation means

1. constructions and operating units containing a nuclear reactor utilising a fission chain reaction;
2. facilities for the production, processing, storage and disposal of nuclear materials, except uranium ore treatment plants and storages of uranium concentrate;
3. repositories of radioactive waste, with the exception of repositories containing only natural radionuclides;

4. facilities for the storage of radioactive waste with an activity exceeding the values set out in an implementing legal regulation;

i) classified equipment means nuclear-safety-related components or systems of nuclear installations assigned to safety classes according to their significance for nuclear installation operation safety, according to the safety function of the system to which they belong, or according to the relevance of their possible breakdown. The criteria for classified equipment to be assigned and categorised into safety classes shall be set out in an implementing legal regulation;

j) nuclear item means

1. nuclear materials which are

aa) source materials represented by uranium containing a mixture of isotopes occurring in nature, uranium depleted in the ^{235}U isotope or thorium and each of these items in the form of metal, alloy, chemical compound or concentrate, as well as materials containing one or more of these items in a concentration or amount exceeding values set out in an implementing legal regulation;

bb) special fission materials represented by ^{239}Pu, ^{233}U, uranium enriched in the isotope ^{235}U or ^{233}U and materials containing one or more of these radionuclides, except initial materials exceeding in concentration or amount values set out in an implementing legal regulation;

cc) other materials, should implementing legal regulation so determine;

2. selected items which are materials, equipment or technologies designed and manufactured to be used in the nuclear field, a list of which shall be provided in an implementing legal regulation;

3. dual-use items, which are materials, equipment and technologies not designed and manufactured to be used in the nuclear field but which may be utilised there, a list of which shall be provided in an implementing legal regulation;

k) radiation incident means an event resulting in an inadmissible release of radioactive substances or ionising radiation, or an inadmissible exposure of individuals;

l) radiation accident means radiation incident requiring urgent measures in order to protect the population and environment;

m) radiological emergency means a situation following the radiation accident or such radiation incident or such increase in level of radioactivity or exposure which require urgent action in order to protect individuals;

n) emergency plan means a set of planned measures to deal with a radiation incident or radiation accident and to limit their consequences which is elaborated for:

1. nuclear installation premises or workplaces in which radiation practicies are performed (on-site emergency plan);
2. transport of nuclear materials or ionising radiation sources (emergency rule);
3. the region in the vicinity of the nuclear installation or the workplace with a source of ionizing radiation where, based on results of analyses of potential radiation accident consequences, emergency planning requirements are in force and which is called emergency planning zone (off-site emergency plan);

o) decommissioning means activities aimed at releasing nuclear installations or workplaces where radiation practices were performed, for their utilisation for other purposes;

p) radioactive substance means any substance that contains one or more radionuclides and whose activity or concentration cannot be disregarded as far as radiation protection is concerned;

r) radioactive waste means substances, objects or equipment containing or contaminated by radionuclides for which no further use is foreseen;

s) radioactive waste and spent fuel storage means a temporary emplacement of radioactive waste or spent or irradiated nuclear fuel for a period restricted in advance into areas, facilities or installations designed for this purpose;

t) radioactive waste disposal means a permanent emplacement of radioactive waste in an areas, facilities or installations without the intention of its further retrieval;

u) radioactive waste repository means an area, facility or installations at the surface or underground used for the disposal of radioactive waste;

v) limits and conditions for the safe operation of a nuclear installation means a set of unambiguously defined conditions for which it is proven that operation of a nuclear installation is safe and which is comprised of data on admissible parameters, requirements for the operability of the installation, protective system settings, requirements for personnel activity and organisational measures to meet all the defined conditions for design operational modes;

w) ionising radiation means transfer of energy in the form of particles or electromagnetic waves of the wavelength equal to 100 nanometers or less, or frequency of 3×10^{15} Hertz or more, capable of producing ions directly or indirectly;

x) exposure means an exposure of individuals and the environment to ionising radiation; it is namely

1. occupational exposure of workers performing radiation practices;
2. medical exposure of individuals
   - aa) as a part of their medical examination or treatment;
   - bb) as part of their occupational health services and periodic reviews of their health;
   - cc) participating in the process of verification of new knowledge or methods which have not yet been introduced in clinical practice;
   - dd) for purposes laid down by special legal regulation[1];
3. emergency exposure of individuals due to a radiation incident or a radiation accident, with the exception of an emergency exposure of intervening individuals;
4. emergency exposure of intervening individuals voluntarily involved in intervention, during which some of dose limits laid down for exposed workers may be exceeded;
5. lasting exposure resulting from long-term after-effects of a radiological emergency or radiation activities performed in the past;
6. potential exposure which cannot be surely foreseen, however the probability of its occurrence may be estimated in advance;

y) exposed worker means any person subject to an occupational exposure; meanwhile it is not essential whether the individual is an employee, or person in a different labour-legal position;

z) members of the public means any person, with the exception of exposed workers while performing their work, apprentices and students during their working hours, individuals exposed due to their own medical diagnosis or treatment, individuals knowingly and willingly beyond their working obligations help to persons undergoing medical exposure as part of their medical diagnosis or treatment and volunteers participating in application of methods which have not yet been introduced in the clinical practice;

aa) critical group of the population means a model group comprising these individuals from the population whose exposure relating to a given source of ionising radiation and a given way of exposure is the highest;

bb) supervised area means an area subject to systematic supervision for the purposes of radiation protection;

cc) controlled area means an area to which access is controlled and which are subject to special rules for the purpose of radiation protection or of preventing the spread of radiation contamination;

dd) optimisation of radiation protection means procedures for achieving and maintaining such levels of radiation protection by which the risks to life, human health and environment are as low as reasonably

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1 E.g. Act No 141/1961 Coll. Code of Criminal Procedures

achievable, considering the existing economic and social circumstances;

ee) dose constraint means an upper limit of prospective doses to individuals which may result from a defined source, for use at the planning stage in radiation protection whenever optimisation is involved;

ff) guidance level means an index or a criterion used for the evaluation of the radiation protection level in the case where details on radiation activities or interventions enabling to evaluate the optimisation of radiation protection in particular given case are not available;

gg) reference level means an index or a criterion whose exceeding or non-meeting leads to adoption of measures in radiation protection; an implementing legal regulation shall lay down details for determination of reference levels and measures adopted as a result of their exceeding;

hh) diagnostic reference level means a guidance level for exposure in medical radiodiagnostics;

ii) clearance level means a level of specific activity or total activity at or below which radioactive waste, radioactive substances and materials or equipment containing radionuclides or contaminated by them may be released into environment without an approval of the State Office for Nuclear Safety;

jj) exemption level means level of specific activity or total activity at or below which the contamination by radionuclides is usually considered to be insignificant;

kk) maximum permitted level means an index or a criterion for regulation of inadmissible exposure to a natural radionuclides;

ll) intervention means activities aimed at averting or reducing the exposure to radiation from ionising radiation sources which are not part of radiation activities or which are out of control, by acting on sources, transmission pathways or exposed individuals;

mm) health detriment which is made by estimation of the risk of reduction in length and quality of life means probability of the harm to the health arising from somatic effects of ionising radiation, including cancer, and severe genetic disorders occurring in individuals following exposure to ionising radiation.

Section 3
Competence of the State Office for Nuclear Safety

(1) State administration and supervision of the utilisation of nuclear energy and ionising radiation and in the field of radiation protection shall be performed by the State Office for Nuclear Safety[1a] (hereafter referred to as "the Office").

(2) The Office

a) shall carry out State supervision of nuclear safety, nuclear items, physical protection, radiation protection and emergency preparedness and shall inspect the adherence to the fulfilment of the obligations arising out of this Act;

b) shall monitor non-proliferation of nuclear weapons and carry out state supervision of nuclear items and physical protection of nuclear materials and nuclear installations;

c) shall issue licences to perform practices governed by this Act and shall issue type-approvals for packaging assemblies for transport and storage of nuclear materials and radioactive substances given in an implementing legal regulation, ionising radiation sources and other products;

d) shall issue authorisations for activities performed by selected personnel;

[1a] Section 1 (4) of Act of the Czech National Council No. 21/1993 Coll., amending Act of the Czech National Council No. 2/1969 Coll., on the Establishment of Ministries and Other Central Authorities of State Administration of the Czech Socialist Republic, in the wording of subsequent regulations, and by which further measures in the system of central authorities of State administration of the Czech Republic are executed.

e) shall approve documentation, programmes, lists, limits, conditions, methods of physical protection assurance, emergency rules and, subject to discussion with the relevant Regional Authorities and relevant Municipal Authorities of Municipalities with extended competence of compatibility with off-site emergency plans, on-site emergency plans and their modifications;

f) shall establish conditions, requirements, limits, maximum permitted levels, maximum permitted levels of radioactive contamination of foodstuffs, guidance levels, dose constraint, reference levels, diagnostic reference levels, exemption levels and clearance levels;

g) shall establish the emergency planning zone and, if applicable, its further structuring, and shall approve delineation of the controlled area;

h) in accordance with an implementing legal regulation, shall establish requirements on emergency preparedness of licensees, and shall inspect their fulfilment;

i) shall monitor and assess the exposure status and regulate exposure of individuals;

j) shall issue, register and verify personal radiation passport; related details shall be set out in an implementing legal regulation;

k) shall provide information to municipalities and Regional Authorities concerning radioactive waste management within their territory of administration;

l) shall control the activity of the National Radiation Monitoring Network, the functions and organisation of which shall be set out in an implementing legal regulation, shall provide for the functioning of its head-office, and shall provide for the activities of an Emergency Response Centre and for an international exchange of information on the radiation situation;

m) shall establish State and Professional examination commissions for verification of special professional competence of selected personnel, and shall issue statutes for these commissions and specify activities directly affecting nuclear safety and activities especially important from the radiation protection viewpoint;

n) shall maintain a State system of accounting for and control of nuclear materials and data and information in accordance with international agreements binding on the Czech Republic, and shall set out requirements for accounting methods and inspection thereof in an implementing legal regulation;

o) shall maintain a national system for registration of licensees, registrants, imported and exported selected items, ionising radiation sources, and a record of exposure of individuals;

p) shall ensure, by means of the National Radiation Monitoring Network and based on assessment of a radiation situation, the availability of background information necessary to take decisions aimed at reducing or averting exposure in the case of a radiation accident;

r) shall approve a classification of nuclear installation or its components and nuclear materials into appropriate categories, from the physical protection viewpoint;

s) shall perform the function of the national authority for an international verification of a comprehensive ban of nuclear tests;

t) shall ensure international co-operation within its sphere of competence and, in particular, shall be an intermediary of technical co-operation with the International Atomic Energy Agency, and within its sphere of competence shall communicate information to the European Commission or, if applicable, to other bodies of the European Union;

u) shall decide on assurance of handling nuclear items, ionising radiation sources or radioactive wastes having been treated inconsistently with rules of law, or where the detrimental condition is not being removed; 0

v) shall be obliged to give out information according to special legal provisions[1b] and once a year to publish a report on its activities and submit it to the Government and to the public.

[1b] Act No 213/1998 Coll., on the right on information about the environment, as amended by Act No 132/2000 Coll. Act No 106/1999 Coll., on free access to information, as subsequently amended

CHAPTER TWO

GENERAL CONDITIONS FOR PERFORMANCE OF PRACTICES RELATED TO NUCLEAR ENERGY UTILISATION, RADIATION ACTIVITIES AND INTERVENTIONS TO REDUCE EXPOSURE

Section 4

(1) Nuclear energy and nuclear items may be utilised in accordance with international commitments of the Czech Republic[2] solely for peaceful purposes.

(2) Whoever utilises nuclear energy or performs radiation activities or interventions to reduce natural exposure or exposure due to radiation incidents must ensure that his or her action is justified by the benefits outweighing the risks arising or liable to arise from these activities.

(3) Whoever performs practices related to nuclear energy utilisation or radiation practices shall proceed in such a manner that nuclear safety and radiation protection are ensured as a matter of priority.

(4) Whoever utilises nuclear energy or performs radiation activities, prepares or performs interventions to reduce emergency, lasting or natural exposure must maintain a level of nuclear safety, radiation protection, physical protection and emergency preparedness such that the risk to human life health and to the environment shall be kept as low as reasonably achievable, economic and social factors being taken into account. Implementing regulation shall establish the technical and organisational requirements and guidance levels of exposure, which are considered to be sufficient to demonstrate a reasonably achievable level or an alternative procedure to demonstrate this level.

(5) Intervention aimed at averting or reducing an exposure shall always be performed if the exposure:

a) approaches or without the intervention could approach levels at which acute damage to health is caused, or

b) exceeds or without the intervention could exceed guidance levels set out in the implementing legal regulation and if expected reduction in health detriment due to intervention is sufficient to justify harm and costs related to the intervention. Implementing legal regulation shall establish guidance levels and details on rules for preparation and undertaking of intervention.

(6) Whoever performs radiation activities shall reduce exposure of persons so that the total exposure caused by a possible combination of exposure from all radiation activities does not exceed as a total the specified exposure limits. The Office shall establish the exposure limits in an implementing legal regulation. The Office is authorised to establish dose constraint as upper limits for optimisation of radiation protection and in its approval to establish lower limits, specific for a given activity (hereinafter “authorised limits”).

(7) The following shall not be subject to the exposure limits:

a) medical exposure; the Office shall establish diagnostic reference levels for medical exposure;

b) exposure from natural sources, with the exception of the exposure to those natural sources that are utilised intentionally and consciously and, with the exception of the cases specified in an implementing legal regulation, where exposure to such sources is significantly increased;

c) emergency exposure of intervening individuals; the exposure shall not exceed ten times the limits laid down for exposed workers, unless it is a matter of saving human lives or preventing the development of radiological emergency, potentially causing extensive social and economic consequences. Intervening persons shall be demonstrably informed about the risks relating to such intervention and shall participate in the intervention on voluntary basis only;

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[2] Decree No. 61/1974 Coll. of the Foreign Minister, on the Non-Proliferation Treaty.
Decree No. 62/1974 Coll. of the Foreign Minister, on the Treaty on Prohibition of Siting of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and the Subsoil thereof.

d) emergency exposure.

(8) Any person performing or providing for practices related to nuclear energy utilisation or radiation practices, with the exception to practices as in Section 2 a) items 5 and 6, must have implemented a quality assurance system to the extent and in the manner set out in an implementing regulation, aimed at achieving the required quality of a relevant item, including tangible or intangible products, processes or organisational arrangements, with respect to the importance of this item from the aspect of nuclear safety and radiation protection. The implementing regulation shall establish basic requirements for quality assurance of classified equipment with respect to their safety classification.

(9) For the purpose of physical protection, nuclear installations or their parts shall be placed in category I, II or III. From the aspect of physical protection assurance, guarded, protected and internal areas in nuclear installations must be specified. The classification and the specification are to be carried out from the aspect of the relevance of possible effects on nuclear safety in the event of unauthorised activities. Details concerning the classification and specification, together with the manner and scope of physical protection shall be laid down in an implementing regulation.

(10) For the purpose of physical protection, nuclear materials shall be placed in category I, II or III. Classification of nuclear materials is performed in terms of its type, weight, enrichment and with regard to the consequences of its misuse. Details concerning the classification of nuclear materials into appropriate categories, together with the manner and scope of physical protection, shall be laid down in an implementing regulation.

(11) At workplaces where radiation practices are performed, supervised and control areas shall be delineated. Activities performed in such areas shall be, from the radiation protection viewpoint, subject to permanent surveillance, recording and regulation. Signs indicating supervised and control areas, details for their delineation, details of manners and scope of radiation protection during activities performed there, details for the restriction of access into them and details for reporting of supervised areas and approval of controlled areas shall be laid down in an implementing legal regulation.

(12) Depending on the size of risk to health and the environment caused by ionising radiation, ionising radiation sources shall be classified as insignificant, minor, simple, significant and very significant ones and workplaces where radiation practices are performed, shall be placed into categories I, II, III or IV and exposed workers shall be placed into categories A or B (hereinafter “A category workers” and “B category workers”). Details for classification of ionising radiation sources, including exemption levels, categorisation of exposed workers and classification of workplaces shall be laid down in an implementing legal regulation.

(13) Each A category worker issued with a personal radiation passport shall be obliged to protect it against loss, theft, destroying and misappropriation, and upon a request to present it to the Office or a respective licensee.

(14) Whoever has found a source of ionising radiation or nuclear materials or has such a suspicion shall report without any delay such a finding to the Police of the Czech Republic or to the Office.

(15) Whoever that has determined a loss or a theft of and damage to ionising radiation source, nuclear material or any package thereof shall be obliged to report without any delay such event to the Police of the Czech Republic or to the Office.

(16) Whoever handles the selected items, manufactures package assemblies for exposed or spent nuclear fuel or performs construction of hot chambers or performs research and development activities relating to the nuclear fuel cycle shall report the beginning and scope of such activities to the Office. The scope and the method of such reporting shall be laid down in an implementing legal regulation.

(17) Whoever mines or processes uranium or thorium ores on the Czech Republic’s territory shall keep and submit to the Office a record thereon. The details on keeping and submitting of the records and sample forms shall be laid down in an implementing legal regulation.

Section 5

(1) International transfers of nuclear items into states not owning nuclear weapons and into states owning nuclear weapons but which are not parties to the Non-Proliferation Treaty that would be in breach of

commitment of the Czech Republic under international agreements[2] is prohibited.

(2) Carrying out of any nuclear weapon test explosion or any other nuclear explosion, encouraging or participating in carrying out of any nuclear weapon test explosion or other nuclear explosion is prohibited.

(3) An import of radioactive waste into the territory of the Czech Republic, with the exception of the re-import of ionising radiation sources produced in the Czech Republic or radioactive waste originated from materials exported from the Czech Republic for the purpose of their processing or reprocessing having been approved by the Office, is prohibited.

(4) It is prohibited for persons other than persons authorised so to do under Sections 26 and 48(1) to dispose of radioactive waste on the territory of the Czech Republic.

(5) It is prohibited to add radioactive substances into foodstuffs, toys, jewellery or cosmetic products, as well as to import or export products treated in this manner.

(6) It is prohibited to transport radioactive waste to:

a) a destination south of latitude 60° south;

b) a state party to the Forth ACP-EEC Convention which is not a member state of the European Union unless the transport is a re-export of ionising radiation sources manufactured in such a state or of radioactive waste from materials exported from such a state in order to process or reprocess them in the Czech Republic;

c) a state which, in the option of the competent authority of the country of radioactive waste origin, does not have special legal or, according to accessible information, technical or administrative resources to manage the radioactive waste safely.

Section 6

Exposure to natural sources

(1) If natural radionuclides are used knowingly and intentionally owing to their radioactive, fissile or fertile properties, their handling shall be subject to the provisions of this act in the same scope as a handling of artificial ionising radiation sources. Mining, treatment and processing of radioactive minerals[3] shall be considered the radiation practices.

(2) An implementing legal regulation shall define workplaces where exposure of workers to natural ionising radiation sources or exposure of individuals living within the vicinity of such a defined workplace may increase significantly.

(3) At workplaces specified by an implementing legal regulation referred to in paragraph 2, legal or natural person being in possession of a real estate in which such workplace is situated or owners of such workplace shall be obliged:

a) to inform workers concerned about a potential increase in exposure due to natural ionising radiation sources and about the health risks associated therewith and about an excess of guidance levels and about remedies carried out;

b) to assure measurements allowing to determine annual effective dose to the persons specified in an implementing legal regulation, and record and regularly submit to the Office data, in the scope and the form specified in an implementing legal regulation;

c) to permit release of natural radionuclides into the environment only in the scope not exceeding clearance levels laid down in an implementing legal regulation or in the scope and under the terms specified in a licence issued by the Office under Section 9 (1) h);

d) to take remedial actions aimed at reducing exposure in those cases when guidance levels laid down in an implementing legal regulation are exceeded and when an expected reduction of health detriment due to such remedy is sufficient to substantiate damage and related costs;

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3 Act No 44/1988 Coll. on Protection and Use of Mineral Resources (the Mining Act), in the wording of subsequent regulations.

e) to report to the Office the cases where the exposure of workers due to natural ionising radiation sources may exceed three tenths of any exposure limits for exposed workers; and the same scope of requirements as for A category workers, including preventive healthcare and personal monitoring, is applied to such workers concerned.

(4) Whoever proposes siting of construction with living or accommodation rooms[3a] or applies for a construction permit for such a construction, shall ensure the determination of radon-related index of the site and submit the results to the construction office. If such construction is placed on a site with a radon-related index higher than low, the construction shall be protected preventively against radon penetration from the subsoil. The terms for execution of preventive measures shall be set down by the construction office in a decision on the construction siting or in a construction permit. Determination of radon-related index of a site need not be performed on condition that the construction will have such a location in a terrain that all its circumferential structures are separated from the subsoil with an air layer allowing free circulation of air. An implementing legal regulation shall establish criteria for determination of radon-related index of a site.

(5) For constructions with living or accommodation rooms where level of exposure to natural radionuclides in the inside atmosphere exceeds the guidance levels specified in an implementing legal regulation and the exposure may be reduced by remedial actions resulting in such reduction in health detriment which is sufficient to substantiate damage and costs associated therewith, the owner of the building shall seek the reduction to a level reasonably achievable, taking into account the given economic and social circumstances. Provided the exposure level exceeds maximum permitted levels specified in an implementing legal regulation the construction office shall, due to serious health risks and pertinently in public interest, that necessary adjustments be performed in the building. Any exceeding of guidance or maximum permitted levels and remedies performed shall be reported by the owner to the tenant.

(6) Manufacturers and importers of building materials, manufacturers and importers of bottled water and suppliers of drinking water for general public shall provide for systematic measurements and evaluation of natural radionuclides concentration, and in the scope specified by an implementing legal regulation shall record and file the results and report them to the Office. Neither building materials, nor bottled water, with the exception of water designated as a natural healing source[3b], shall be put into circulation, nor drinking water shall be supplied if:

1. the natural radionuclides concentration exceeds maximum permitted levels laid down by an implementing legal regulation, or
2. the natural radionuclides concentration exceeds guidance levels laid down in an implementing legal regulation, with exception of cases when costs of remedial actions aimed at reduction of radionuclides concentration were provably higher than risks of health detriment.

Section 6a
Lasting Exposure

Owner of a real estate where source of lasting exposure has been identified is responsible for preparation and undertaking of intervention. Provided identified lasting exposure exceeds established guidance levels the owner of such real estate shall promptly report the identified situation to the Office and inform persons using this estate, fence the area concerned and ensure appropriate regulation of access to the area and in the buildings including their uses.

[3a] Decree No. 137/1998 Coll. on General Technical Requirements for Construction.

[3b] Act No. 164/2001 Coll., on Natural Healing Sources, Natural Mineral Water Sources, Natural Health Spas and Places and on Amendment to Some Related Acts.

Section 7
Medical exposure

(1) For medical exposure only ionising radiation sources may be use which meet requirements for medical devices under special legal regulations[4] or radiopharmaceuticals registered or prepared at nuclear medicine workplaces in healthcare facilities in accordance with special legal regulations[4a]. Only then can be applied the medical exposure if justified by a benefit weighing a detriment that the exposure cause or might cause.

(2) Verification of new findings on living humans or application of methods not yet introduced into clinical practice and involving exposure, including the exposure without direct health benefit for individuals undergoing such exposure, shall only be performed under special legal regulations[4b] and based on an affirmative position provided by the Office.

(3) Conditions of medical exposure, diagnostic reference levels, rules for exposure of individuals knowingly and voluntarily helping to individuals subject to medical exposure, including their provable instructing and written approval of such individuals, particulars of the quality assurance programmes for medical treatment and performances and requirements for special professional competence of individuals participating in such performances shall be established in an implementing legal regulation.

Section 8
Discharge of Radionuclides into the Environment

(1) Provided the clearance levels laid down in an implementing legal regulation or in a decision of the Office are not exceeded then radioactive wastes, radioactive substances, objects or equipment containing radionuclides or contaminated by them may be discharged into the environment without a prior approval of the Office; they are not subsequently monitored from the viewpoint of radiation protection and they are treated as if they were not radioactive. In case the content or the contamination by radionuclides exceed the clearance levels, the radioactive wastes and other substances, objects or equipment containing radionuclides or contaminated by them may be discharged into the environment only based on an approval of the Office under Section 9 paragraph 1h).

(2) Provided an approval to discharge substances into the environment is issued by a ministry or other administrative body under specific regulations[5], and the content of radionuclides is one of the aspects under consideration for issue of the approval, an approval of the Office is an obligatory basis for issue of such ministerial approval.

CHAPTER THREE

CONDITIONS FOR NUCLEAR ENERGY AND IONISING RADIATION UTILISATION

Section 9
Licences for Particular Practices

(1) A licence issued by the Office is required for:

a) siting of a nuclear installation or radioactive waste repository,

b) construction of a nuclear installation or category IV workplace,

c) particular stages, laid down in an implementing legal regulation, of nuclear installation commissioning,

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4 Act No. 123/2000 Coll., on Health Care Means, and Amendments to Some Related Acts.

4a Act No. 79/1997 Coll., on Drugs, and Amendment to and Alteration of Some Related Acts, in the wording of Act No. 149/2000 Coll.

4b E.g. Articles 23 and 27b of Act No 20/1966 Coll., on Health Care for People, in the wording of subsequent regulations.

5 E.g. Act No 138/1973 Coll., on water, as amended, Act No 309/1991Coll., on air protection, in the wording of subsequent regulations.

d) operation of a nuclear installation or category III or IV workplace,

e) restart of a nuclear reactor to criticality following a fuel reload,

f) reconstruction or other changes affecting nuclear safety, radiation protection, physical protection and emergency preparedness of a nuclear installation or category III or IV workplace,

g) particular stages of decommissioning of a nuclear installation or category III or IV workplace to the extent and in the manner established in an implementing legal regulation;

h) discharge of radionuclides into the environment to the extent and in the manner established in an implementing legal regulation;

i) ionising radiation sources management to the extent and in the manner established in an implementing regulation;

j) radioactive waste management to the extent and in the manner established in an implementing legal regulation;

k) import or export of nuclear items or transit of nuclear materials and selected items;

l) nuclear materials management;

m) transport of nuclear materials and radioactive substances laid down in an implementing legal regulation; this licence does not relate to the person performing the transport, or to the carrier, unless he is simultaneously the shipper, or consignor or consignee;

n) professional training of selected personnel (Section 18 para 5);

o) re-import of radioactive waste originated in the processing of materials exported from the Czech Republic;

p) international transport of radioactive wastes to the extent and in the manner established in an implementing regulation;

r) performance of personal dosimetry and other services significant from the viewpoint of radiation protection to the extent and in the manner established in an implementing regulation;

s) adding of radioactive substances into consumer products during their manufacturing or preparation or import or export of such products.

(2) Licences issued by the Office under para (1) do not substitute licences or authorisations issued by other administrative bodies under specific regulations[6].

Section 10

(1) A licence shall be issued on condition that

a) the natural person to whom the licence is to be issued, and his responsible representative, if any, have reached the age of 21, are competent to perform legal acts, are persons of probity and are professionally competent; the requirement for the applicant to be professionally competent is waived if it is met by his responsible representative;

b) persons who are in position of a statutory body or are member of a statutory body of a legal person to whom a licence is to be issued, have reached the age of 21, are competent to perform legal acts, are persons of probity, and at least one of members of the statutory body must be professionally competent.

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6 E.g. Act No. 455/1991 Coll., on Trade Enterprises (the Trade Act), in the wording of subsequent regulations, Act No. 222/1994 Coll., on Conditions for Enterprise and the Performance of State Administration in Power Generation Industries and on State Inspection for Power Generation, Act No. 50/1976 Coll., on Land Planning and Construction Regulations (the Construction Act), in the wording of subsequent regulations, Act No. 21/1997 Coll., on Control of Importation and Exportation of Goods and Technologies Subject to International Control Regimes, Act No. 44/1988 Coll., on Protection and Use of Mineral Resources (the Mining Act), in wording of subsequent regulations, Act of the Czech National Council No. 61/1988 Coll., in the wording of subsequent regulations.

(2) The evidence that the applicant has designated a physical person performing systematic surveillance over the fulfilment of radiation protection requirements and meeting requirements on special professional competence under Section 18 para 2 b) and according to the extent and in the manner of ionising radiation sources management (hereinafter "the supervising person") or that the applicant possesses such a special professional competence himself shall be the precondition to issue the licence under Section 9 para 1 i).

(3) A person to whom a licence has been issued (hereinafter referred to as "the licensee") shall communicate to the Office without delay any change that may occur in facts specified in paragraph 1 or 2.

(4) Performance of practices under Section 9 para 1 or their stages shall not commence before the licence issued by the Office enters into legal force.

Section 11
Probity

For the purposes of this Act, a person is considered to be of probity if he has not been legally sentenced for a criminal offence involving negligence, where the facts of the case are associated with licensed activities, or for a criminal offence committed with intent.

Section 12
Professional Competence

Under Section 10 para 1 the professional competence means:

a) for activities related to nuclear energy utilisation a duly completed university degree in the respective field of specialisation and three years of on-job experience in the field;

b) for radiation activities a duly completed university degree in the respective field of specialisation and three years on-job experience in the field, or graduate from a relevant secondary technical school having GCE and six years of on-job experience in the field.

Section 13
Licence Application

(1) A licence application shall contain:

a) for a natural person its name and surname, birth registration number, residential address; or name and surname, birth registration number and residential address of his/her responsible representative, if one is appointed; for a legal person its name and legal form, registered office, registration number in the Companies Register; name and surname, residential address of the person or persons who constitute its statutory body (hereinafter referred to as "identification") and the registration number if already assigned by the Office;

b) the subject and scope of practice for which the licence is requested, the location where the practice is to be performed and the manner in which it will be carried out, the period of its existence and the manner of its termination.

(2) A licence application shall be signed by the applying natural person or by the statutory body of the applying legal person or by another representative of the statutory body, authorised in a Power of Attorney.

(3) The following documents shall be attached to a licence application

a) a certificate of extract from the Criminal Record for the natural person and for his responsible representative, if appointed; a certificate of extract from the Criminal Record for members of statutory body or person who is in position of a statutory body or at least one member of a statutory body, in the event that the applicant is a legal person; the certificate shall be dated within three months of the licence application date;

b) Certificate of Incorporation in the case of legal person entering on the Companies Register,

c) a document proving professional competence of a natural person for the performance of the practice being licensed, or a document proving professional competence of a responsible representative, if appointed, in the event that a natural person submits the application, or a document proving professional competence for the performance of the practice being licensed of at least one of the members of the statutory body or authorised agent in the event that a legal person submits the application; provided a supervising person is appointed his/her approval with the appointment and a document proving his/her special professional competence;

d) the documentation required for the particular practices being licensed. The content of this documentation is listed in an Appendix to this Act. The scope and form of the documentation to be approved by the Office concerning the activities subject to licence, shall be laid down in an implementing regulations;

e) a certificate of land ownership in the case of application for a nuclear installation construction licence and a written consent of the real estate owner with a workplace of category III or IV establishment, provided such a workplace is to be established;

f) an insurance certificate covering nuclear damage liability insurance or a certificate of other financial security as in Section 36;

g) in the event that radioactive waste is to be generated as a part of activities being licensed, a document demonstrating safe management of radioactive waste, including associated funding of this management;

h) in the event of a transit of nuclear materials or radioactive substances a document demonstrating that they will be taken back if the transit is not completed.

(4) An environmental impact assessment, if laid down in a special Act[13], is a prerequisite for the issue of a licence under Section 9 para 1a), b) and g). An environmental impact assessment under the special Act[7], is a prerequisite for a licence issue under Section 9 para1 f) in case a reconstruction or other change influencing nuclear safety, radiation protection, physical protection or emergency preparedness of nuclear installation or category III or IV workplaces is connected with an increase of authorised limits for discharges established by the Office under Section 4 para 6.

(5) An approval issued by the Office of a quality assurance programme for the practice being licensed is a prerequisite for the issue of a licence under Section 9 para 1 a) to g) and i), j), l), n) and r). An approval of a quality assurance programme for the design phase in advance of the commencement of design activities affecting nuclear safety or radiation protection and an approval of the quality assurance programme for construction activities are a prerequisite for a licence granted under Section 9 para 1 b). Requirements for the content of quality assurance programme and quality system shall be laid down in an implementing regulation.

(6) An approval issued by the Office of the method used to ensure physical protection of nuclear installations and nuclear materials is a prerequisite to the issue of a licence under Section 9 para 1 c), d), e), f), g), k), l), and m). Requirements for the method used to ensure physical protection shall be laid down in an implementing regulation.

(7) An approval issued by the Office of the on-site emergency plan or emergency rules is a prerequisite to the issue of a licence under Section 9 para 1c), d), e), f), g), i), j), m) and o). Requirements for their content, including details on how to ensure emergency preparedness, shall be laid down in an implementing regulation.

(8) The Office may require supplementary documentation. The documents under para 3 a), b) and c) do not need to be submitted if the applicant has received a registration number under a previous licensing procedure and there have been no changes to the information provided in the documentation. In such case the applicant shall provide an affidavit only, stating that no changes have occurred in documents required under para 3 a), b) and c).

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[13] Act No 100/2001 Coll., on Environmental Impact Assessment, and on Alteration of Some Related Acts.

Section 14

(1) In administrative proceedings, the Office shall conduct independently of the proceedings of any other administrative body. The applicant shall be the only participant in the proceedings.

(2) The Office shall take a decision on the issue of a licence having verified that the applicant has fulfilled all the conditions established in this Act and in implementing regulations.

(3) From commencement of licence proceedings for a particular practice, the Office shall take a decision within the following time period

a) four months, in the case of a licence for siting of a nuclear installation or very significant ionising radiation source;

b) one year, in the case of a licence for construction of a nuclear installation or very significant ionising radiation source;

c) six months, in the case of a licence for the first fuel load into a reactor, under Section 9 para 1 c), and 10 days in the case of other stages of commissioning;

d) 24 hours, in the case of a licence under Section 9 para 1e); the procedure for submission and assessment of required documentation shall be laid down in an implementing regulation;

e) 60 days, in the case of other licences for particular practices.

(4) A licence represents at the same time an approval as required by a specific Act[14].

Section 15

Requisites of Licence

(1) In decision on the issue of a licence, the Office

a) shall specify identification of the applicant and the assigned registration number;

b) shall define the subject and scope of the practice being licensed;

c) shall set conditions for performance and termination of the practice being licensed, as required from the aspect of nuclear safety, radiation protection and physical protection and, subject to discussion with the relevant Regional Authority and relevant Municipal Authorities of Municipalities with extended competence, conditions for emergency preparedness;

d) shall specify the period for which the licence is issued.

(2) An integral part of the licence Statement shall be an approval of documentation, if this is required in the Appendix to this Act. A single decision may cover several repeated or interrelated activities.

Section 16

Alteration, Cancellation and Cessation of Licence

(1) Without a previous licence provided by the Office, no installation modifications nor other technical or organisational changes with an impact on nuclear safety, radiation protection, physical protection or emergency preparedness may be performed. Changes influencing the off-site emergency plan may only be performed subject to an agreement with the relevant Regional Authority and relevant Municipal Authorities of Municipalities with extended competence,.

(2) A licence is not required to take urgent interventions aimed at averting a radiation incident or dealing with its consequences. Such intervention shall be taken without delay and shall be demonstrably

14 E.g. Act No. 50/1976 Coll., in the wording of subsequent regulations.

communicated to the Office.

(3) The Office may modify conditions set out in the licence in the event of a change in the circumstances impacting on nuclear safety, radiation protection, physical protection or emergency preparedness under which the licence is issued, or as a response to an application by the licensee. The conditions of a licence impacting on off-site emergency plan may be established and altered only subject to agreement with the relevant Regional Authority and relevant Municipal Authorities of Municipalities with extended competence.

(4) In the event of a licensee violating his obligations as established in this Act or by other regulations or conditions laid down in the licence issued by the Office, the Office may restrict or suspend performance of the licensed practice.

(5) The Office shall withdraw the licence if the licensee

a) ceases to fulfil the obligations on which the issue of licence is based or does not fulfil his obligations as established in this Act or does not remove, within a specified period, deficiencies identified by the Office;

b) applies in writing for a withdrawal, and proves that he has ensured nuclear safety and radiation protection.

(6) A licence shall become extinct

a) in the case of natural persons, in the event that the person dies or is declared to be dead;

b) on the date a legal person which is a licensee ceases to exist;

c) on expiry of the period for which it was issued;

d) by decision of the Office to cancel the licence.

(7) Before a licence become extinct, the licensee shall, with the approval of the Office, provide on a contractual basis a legal successor or ensure safe termination of activities related to nuclear energy utilisation or radiation activities.

Section 17

General Obligations of Licensees

(1) A licensee under Section 9 para 1shall, besides other obligations established in law

a) ensure nuclear safety, radiation protection, physical protection and emergency preparedness, including its verification, in the scope appropriate to the particular licences;

b) assess in a systematic and comprehensive manner the fulfilment of conditions set in Section 4, from the aspect of the current level of science and technology, and ensure that the assessment results are put into practice;

c) comply with the conditions of the licence issued by the Office, proceed in accordance with approved documentation and investigate, without delay, any breach of such conditions or procedures and take remedial measures and measures to prevent repetition of such situations. Any case when exposure limits or limits for safe operation of a nuclear installation have been exceeded or violated shall be reported to the Office without delay;

d) comply with technical and organisational conditions for safe operation of nuclear installations, ionising radiation sources and workplaces with ionising radiation source as laid down in an implementing regulations, comply with the approved quality assurance programme and adhere to specific requirements for uniformity and correctness of measurements and measuring devices to the extent laid down in an implementing regulation;

e) provide co-operation as required for performance of inspection activities by the Office under Section 39 and provide co-operation for persons called upon by the Office in order to assess expert issues related to the performance of an inspection;

f) participate in the operation of the National Radiation Monitoring Network to the extent established in government order under Section 19 para 3;

g) introduce into circulation only ionising radiation sources that bear the specified labels and are accompanied by appropriate documentation and are in type-approved transport packaging;

h) allow authorised persons only to handle nuclear materials, radioactive waste and ionising radiation sources and to handle them in accordance with this Act;

i) entrust performance of the specified activities only to such persons who fulfill conditions of special professional competence and are physically and mentally sound, and for persons performing sensitive activities under a specific legal regulation [9a] verify their competence in respect to security in a manner laid down in a specific legal regulation[9];

j) report to the Office without delay any change or event impacting on nuclear safety, radiation protection, physical protection, nuclear materials management or emergency preparedness, and changes in any circumstances on which issue of the licence was based;

k) provide the public with information on maintenance of nuclear safety and radiation protection which is not subject to State, professional or commercial secrecy;

l) inform without any delay the Office about a declaration of insolvency or refusal of bankruptcy due to the lack of assets.

(2) A licensee shall submit to the Office for approval

a) documentation mentioned in the Appendix to this Act and quality assurance programmes as in Section 4 para 7;

b) commissioning and decommissioning programmes and non-standard programmes or tests affecting nuclear safety as specified in the licence;

c) transport, storage, loading and reloading of nuclear fuel and related activities programmes as specified in the licence;

d) a list of important working activities impacting on nuclear safety, competence requirements, professional training and method of its verification;

e) assignment of nuclear installations and nuclear materials to categories appropriate from the aspect of physical protection;

f) the on-site emergency plan and the emergency rules;

g) changes to the documentation specified in a) to f) above.

(3) A licensee shall submit to the Office a proposal for designation of an emergency planning zone and for delineation of a controlled area.

Section 18

Obligations from the Aspect of Nuclear Safety, Radiation Protection, Physical Protection and Emergency Preparedness

(1) A licensee shall also

a) monitor, measure, evaluate, verify and record values, parameters and facts impacting on nuclear safety, radiation protection, physical protection and emergency preparedness, to the extent laid down in an implementing regulations;

b) account for and control of nuclear materials, archive associated records and report to the Office, as laid

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[9a] Section 81 b para 3 of the Act No. 148/1998 Coll. in the wording of Act No. 310/2002 Coll.

[9] No. 148/1998 Coll. on Protection of Classified Information and Amendments to Related Acts, in the wording of subsequent regulations.

down in an implementing regulation, results of physical inventory taking and material balance of nuclear materials and any changes in nuclear materials inventory;

c) keep and archive records of ionising radiation sources, facilities, materials, activities, quantities and parameters and other facts impacting on nuclear safety, radiation protection, physical protection and emergency preparedness, and submit the recorded information to the Office in the manner set out in an implementing regulation;

d) keep production of radioactive waste and spent nuclear fuel to the minimum necessary level;

e) prepare and submit to the legal person authorised to dispose of radioactive waste under Section 26 data on short-term and long-term production of radioactive waste and spent nuclear fuel together with other background information to determine the amount and method of transfer of payments to the nuclear account;

f) keep records of radioactive waste by type of waste in such a manner that all characteristics affecting its safe management are apparent;

g) allow access and provide necessary co-operation for performance of inspection activities to International Atomic Energy Agency inspectors, as in Section 39 para 5, and to persons called upon by the Office to assess expert aspects of inspected activities;

h) in case an estimate of total costs of decommissioning verified by the Radioactive Waste Repository Authority (hereinafter "the Authority") exceeds 300 000 CZK, steadily make provision[10] for decommissioning of nuclear installation or category III or IV workplace, so that financial resources deposited on a blocked account will be available for preparation and performing of decommissioning, at the required time and in the required amount, in line with the programme of decommissioning approved by the Office. Provided the estimate of total costs exceeds 1 billion CZK the licensee shall deposit financial means at the amount of this provision on a blocked account with a bank in the Czech Republic. Yields from means on the blocked account shall be income to this blocked account. The provision shall be expenditure for generating, ensuring and maintaining revenues. Details for making provision shall be established in an implementing regulation. Financial means on the blocked account may be utilised solely for the preparation and an implementation of decommissioning and any drawing on such funds shall be approved by the Authority. The obligation to make provision for the decommissioning shall not apply to organisational units of the state[11], and state-subsidised organisation[11a], public universities [11b] and organisational bodies and subsidised organisations established by territorial self-governing units [11c];

i) ensure systematic supervision of observance of nuclear safety, radiation protection, physical protection and emergency preparedness, including verification of emergency preparedness;

j) ensure medical examination prior to employment or classification as category A workers and at least once a year periodic reviews of health and in cases where, according to the Office evaluation exposure limits have been exceeded to ensure extraordinary and subsequent reviews of health[11d] and for the employees performing activities with direct impact on nuclear safety assure verification of their mental competence. The costs of the medical examinations shall be paid by the employer unless a specific regulation shall set out otherwise. The licensee shall also on regular basis inform occupational health services providing medical surveillance of exposed workers about personal doses of the workers;

k) ensure conditions for pregnant and breastfeeding women working within a controlled area such that a foetus or a breastfed infant receives the same level of radiation protection as any member of the public;

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10 Act No. 593/1992 Coll. on Reserves for Calculation of the Income Tax Base, in the wording of subsequent regulations.

11 Article 3 of Act No 219/2000 Coll. on the State Property of Czech Republic and its Behavior in Legal Relations

11a Act No. 218/2000 Coll. on Budgetary Rules and Alteration of Some Related Acts (Budgetary Rules), in the wording of subsequent regulations.

11b Act No. 111/1998 Coll., on Universities and Amendment to and Alteration of Some Related Acts (Universities Act) in the wording of subsequent provisions.

11c Act No. 250/2000 Coll., on Budgetary Regulations for Regional Budgets, as amended by Act No. 320/2001 Coll.

11d Article 84 para 1v) of Act No. 258/2000 Coll., on Public Health Protection and on Alteration of Some Related Acts, in the wording of subsequent regulations

l) verify competence in respect to security in a manner laid down in a specific legal regulation[9]) for persons performing sensitive activities under a specific legal regulation[9a]) and verify probity of personnel and persons handling category I and II nuclear materials, providing physical protection of nuclear installations and nuclear materials, having unsupervised access to internal premises of nuclear installations and ensure that only such persons perform, control and inspect the mentioned activities and have access to the internal and protected areas of a nuclear installation;

m) verify probity of a part of personnel and persons handling category III nuclear materials or having unsupervised access to guarded and protected areas of a nuclear installation and ensure that only such persons perform the activities in question and have an access to guarded and protected areas of a nuclear installation;

n) suspend the validity of an approval to handle nuclear materials or enter nuclear installations for an employee, in a case where and at the moment when a licensee learns that legal proceedings have commenced with such an employee for a criminal offence perpetrated through negligence, where the facts of the case are related to activity performed, or for a criminal offence committed with intent;

o) provide a system of training and verification of competence of personnel in accordance with the importance of the work they perform;

p) hand over to the Office and to the European Commission data required by this Act and by the EC legislation; the scope of data, the form and the manner of the handover shall be established in an implementing regulation;

r) provide A category exposed workers working in the controlled area of another licensee with personal radiation passports issued by the Office and regularly update the data therein to the extent and in the manner laid down in an implementing regulation.

(2) A special professional competence, within the meaning of this Act, means

a) skills and expertise of natural persons, as verified by a State Examination Commission and required for activities directly affecting nuclear safety of nuclear installations. The State Examination Commission shall be established and its Chairman and members appointed by the Chairman of the Office;

b) skills and expertise of natural persons, as verified by an Expert Examination Commission of the Office and required to perform activities especially important from the radiation protection viewpoint, set in an implementing regulation.

(3) Activities directly affecting nuclear safety may only be performed by natural persons who are physically and mentally competent, with professional competence and to whom the Office has granted an authorisation for the activities in question, subject to an application by the licensee.

(4) Only natural persons with knowledge of the principles and procedures of radiation protection, as verified by the Expert Examination Commission of the Office, and holding an authorisation to perform the working activity in question granted by the Office may perform activities especially important from the radiation protection viewpoint specified by an implementing legal regulation.

(5) Activities directly affecting nuclear safety and activities especially important from the radiation protection viewpoint, qualification and professional training requirements, the method to be used for their verification and the issue of authorisations for persons authorised to perform activities as in para (3) and (4) (hereinafter referred to as "selected personnel") shall be laid down in an implementing regulation.

(6) A licensee who operates a controlled area in which A category workers of another licensee (outside workers) perform activities shall check their personal radiation passports before beginning of the activities and shall make entries into them to the extent and in the manner laid down in an implementing legal regulation.

Section 19
Obligations in case of Radiation Incident Occurrence

(1) A licensee shall, to the extent and in the manner determined by the on-site emergency plan approved by the Office

a) in accordance with a special legal regulation [11e] immediately notify the relevant Municipal Authority of Municipality with extended competence, the Office and other relevant bodies specified in the on-site emergency plan of the occurrence or suspected occurrence of a radiation accident;

b) in the event of a radiation accident, ensure that a warning is issued to the public within the emergency planning zone;

c) ensure that the consequences of the radiation incident are dealt with in premises where his activities are performed and take steps to protect employees and other persons from the effects of ionising radiation;

d) ensure monitoring of exposures of employees and other persons and prevent any escape of radionuclides or ionising radiation into the environment;

e) inform relevant bodies, especially of monitoring results, factual and anticipated development of the situation, interventions taken to protect employees and the public, and interventions taken to deal with the radiation incident, and also of factual and anticipated exposure of people;

f) control and regulate exposure of employees and persons participating in the radiation incident mitigation within the premises where he performs his activities;

g) co-operate in dealing with the consequences of the radiation incident that occurred on his premises;

h) in the event of a radiation accident, participate in the activities of the National Radiation Monitoring Network.

(2) A licensee for transport as in Section 9 para1m) shall also, to the extent and in the manner established in the emergency rules approved by the Office

a) in accordance with a special legal regulation [11e] immediately inform the relevant Municipal Authority of Municipality with extended competence, the Office and other relevant bodies specified in the emergency rules of the occurrence or suspected occurrence of a radiation accident;

b) in the event of a radiation incident, take immediate steps to protect persons involved in transport from the effects of ionising radiation;

c) immediately inform relevant bodies of, in particular, his monitoring results, factual and anticipated development of the situation, interventions taken to protect persons involved in transport and interventions taken to deal with the radiation accident, and also of factual and anticipated exposure of people;

d) control and participate in regulation of exposure of people involved in transport and participating in the radiation incident clean-up process;

e) co-operate in dealing with the consequences of a radiation accident that has occurred on his equipment.

(3) A licensee shall also submit to the relevant Regional Authority and relevant Municipal Authorities of Municipalities with extended competence background documents to prepare the off-site emergency plan, co-operate with it to ensure emergency preparedness within the emergency planning zone, to the extent established in a government order concerning the emergency planning zone, and participate financially, at his own cost[12] in enabling the activities of the National Radiation Monitoring Network, providing the public in the emergency planning zone of relevant installations or workplaces with antidotes, running a press and information campaign aimed at ensuring that the public is prepared for radiation accidents, providing a system for notification of relevant bodies to the extent and in the manner established in the on-site emergency plan, and providing a warning system to inform the public living in the vicinity of the nuclear installation, and shall participate in radiation accident clean-up operations within the emergency planning zone.

[11e] Article 5 of Act No 239/2000 Coll., on the Integrated Rescue System and Amendments to Some Related Acts

[12] Section 24 para2 p) of Act No. 586/1992 Coll., on Income Taxes, in the wording of subsequent regulations.

Section 20

Obligations in Transport and Shipment of Nuclear Item and Radioactive Substances

(1) A licensee under Section 9 para 1m) or a person who arrange for such a shipment of radioactive substances to be carried out specified as a sender in the shipping documents (hereinafter "the carrier") is obliged to

a) make sure that a consignee is authorised to handle nuclear materials or radioactive substances in accordance with this Act;

b) ensure that the transport and shipment of nuclear materials and radioactive substances specified in an implementing regulation is performed as specified in an implementing regulation and in accordance with the requirements established in special legal regulations[13];

c) supply nuclear materials and radioactive substances specified in an implementing regulation solely in packaging assemblies which have been type-approved by the Office in accordance with this Act;

d) ensure that during transport and shipment neither radionuclide escape nor exposure of people exceeds limits and guidance levels laid down in an implementing regulation, and ensure physical protection of nuclear material shipments in accordance with the implementing regulation.

(2) A licensee under Section 9 para 1i), j), k) or m) shall ensure that a person making a shipment of nuclear items or radioactive substances specified in an implementing regulation reports their entry to or exit from the territory of the Czech Republic to a border Customs Office and submits to this Customs Office an authorised copy of a relevant licence and, in the case of a transit shipment, on entry an authorised copy of a valid licence of the country to which the nuclear items or radioactive substances are being shipped from the Czech Republic. Unless this condition is fulfilled, the Customs Office shall not grant the goods passage. The Customs Office shall communicate the information contained in these documents to the Office. The provision of this paragraph does not cover transit shipments of items of dual use.

Section 21

Use of Insignificant and Minor Ionising Radiation Sources

(1) A licence for ionising radiation sources management under Section 9 para 1i), is not required for the use of insignificant or type-approved minor ionising radiation sources, if used in accordance with user manuals provided for the sources which have been approved by the Office as part of their type-approval.

(2) A minor source user (hereinafter referred to as a "registrant") is required to notify the Office not later than one day before commencement of this activity of the following

a) the identification of the registrant;

b) the specification of the ionising radiation sources to be utilised and their quantity;

c) the facility where the sources will be located;

d) the proposed method of disposal of the ionising radiation sources;

(3) A licence for ionising radiation sources management under Section 9 para 1i) and notification under para 2 are not required if they concern individual working operations and work with sources, within an approved or notified process of handling of ionising radiation sources.

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13 E.g. Act No. 111/1994 Coll. on Road Transport, Decree No. 187/1994 Coll. of the Ministry of Transport, which implements the Road Transport Act, Act No. 266/1994 Coll., on Railways, Appendix 1 to Decree of the Minister of Foreign Affairs No. 8/1985 Coll., on the Convention on International Rail Transport (COTIF), Act No. 114/1995 Coll., on Inland Navigation, Decree of the Ministry of Transport No. 17/1966 Coll., on Air Transport Rules, in the wording of Decree No. 15/1971 Coll.

Section 22
Obligations of the Registrant

A registrant shall

a) use ionising radiation sources only in accordance with user manuals approved by the Office as part of their type approval under Section 23;

b) notify the Office of any change in information provided under Section 21;

c) check on any breach of this Act or of implementing regulations and take remedial measures;

d) ensure safe termination of activities;

e) maintain and keep records of ionising radiation sources and communicate the recorded information to the Office, as laid down in an implementing regulation;

f) provide the necessary co-operation for performance of inspection activities by the Office.

Section 23

Type-Approval

(1) Packaging assemblies for transport, storage or disposal of nuclear materials and radioactive substances specified in an implementing regulation may only be used if type-approved by the Office. Ionising radiation sources specified in an implementing regulation may be placed on a market only if type-approved by the Office. Conformity assessment of products carried out in accordance with procedures laid down in special legal regulation[13a] shall replace type-approval of the Office, and products assessed in this way shall be considered type-approved hereunder unless provided otherwise by a special legal regulation[13a]; this shall not apply to packaging assemblies for transport, storage or disposal of nuclear material and radioactive substances specified in an implementing legal regulation.

(2) The Office shall open type-approval proceedings under para 1 on application by a manufacturer or, in the case of imported equipment, on application by the importer, on the day the application is received. The Office shall make a decision in respect of a type-approval application for a packaging assembly for transport or storage of nuclear materials or radioactive substances specified in an implementing regulation within 12 months of commencement of the proceedings. In other cases within 90 days since the commencement of the proceedings. Requisites for the application, documents to be attached to the application and the method of approval shall be laid down in an implementing regulation.

(3) In the case of products defined in an implementing regulation, documentation of tests performed at the applicant's cost at legal entities designated by the Office shall become part of the background documents required by the Office to issue a type-approval decision.

(4) A manufacturer of equipment under para 1 that is manufactured for the purposes of introduction into circulation shall manufacture such equipment in conformity with the type-approved by the Office, verify the identity of characteristics and parameters of particular products with the approved-type and demonstrate this identity, to the extent and in the manner established by the Office in the equipment type-approval decision or in an implementing regulation.

(5) An equipment importer under para 1 shall import types approved by the Office only. The importer or a person introducing this equipment into circulation shall ensure conformity assessment of characteristics and parameters of particular products with the approved type and demonstrate this conformity, to the extent and in the manner established by the Office in the equipment type-approval decision or in an implementing regulation.

(6) Insignificant and minor ionising radiation sources and B(U)–type[13b] package assemblies for transport of

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[13a] Sections 12 and 13 of Act No. 22/1997 Coll., on Technical Requirements for Products and Alterations and Amendments to Some Related Acts, in the wording of Act No. 71/2000 Coll.

[13b] Decree No. 142/1997 Coll., on Type-Approval of Assemblies for Transport, Storage or Disposal of Radionuclide Sources and Nuclear Materials, Type-Approval of Protective Aids for Works with Ionising Radiation Sources and Other Equipment for the Work therewith (on Type –Approval).

radioactive substances approved in a similar manner in the EU Member States shall be considered type-approved hereunder.

CHAPTER FOUR
RADIOACTIVE WASTE MANAGEMENT

Section 24

(1) Any person who manages radioactive waste shall take into consideration all its physical, chemical and biological properties that might have a bearing on its safe management.

(2) An owner of radioactive waste or other natural person or legal person managing the assets of an owner in such a manner that radioactive waste is generated (hereinafter referred to as a "generator") shall bear all costs associated with its management, from its time of origin to its disposal, including monitoring of radioactive waste repositories after their closure, and including the necessary research and development activities. A contractual transfer of rights to manage radioactive waste or of its ownership must be stipulated in writing.

(3) Until a generator or the Office declares spent or irradiated fuel to be radioactive waste, its management, apart from the requirements arising out of other provisions of this Act, is subject to the same requirements as apply to radioactive waste. An owner of spent or irradiated fuel shall manage it in such a way as not to encumber the potential for subsequent conditioning.

(4) Radioactive waste management shall not be subject to the Act on Waste[14]. Details concerning radioactive waste management shall be laid down in an implementing regulation.

Section 25

Under the terms of this Act, the State guarantees safe disposal of all radioactive waste, including monitoring and supervision of repositories after their closure.

Section 26

(1) To provide for activities associated with radioactive waste disposal, the Ministry of Industry and Trade shall set up the Authority as a State organisation. The Authority shall carry out particular activities based on a licence under Section 9 para 1, of this Act. In case of the Authority ceasing to exist, its rights and obligations shall be transferred to its founder.

(2) The activities of the Authority shall be financed from an interest-bearing account opened with the Czech National Bank (hereafter referred to as "the nuclear account"). The Ministry of Finance shall manage the nuclear account, which shall be included among the accounts of State financial assets and liabilities, the utilisation of which is decided by the Government[15]. Resources in the nuclear account may only be used for purposes within the provisions of this Act.

(3) The Authority shall engage in the following activities

a) preparation, construction, commissioning, operation and closure of radioactive waste repositories and monitoring of their impact on the environment;

b) radioactive waste management;

c) conditioning of spent or irradiated nuclear fuel into a form suitable for its disposal or further utilisation;

d) keeping records of radioactive waste receipts and their generators;

e) administration of payments under Section 27;

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14 Act No. 238/1991 Coll., on Waste, in the wording of Act No. 300/1995 Coll.

15 Act No 576/1990 Coll. on Budgetary Rules of the Czech Republic, in the wording of subsequent regulations.

f) drafting of proposals for determination of payments to the nuclear account;

g) provision for and co-ordination of research and development in the field of radioactive waste management;

h) monitoring of reserves of licensees for decommissioning of their installations and approval of drawing on funds in the reserves;

i) provision of services in the field of radioactive waste management;

j) management of radioactive waste transported to the territory of the Czech Republic from abroad when it is not possible to return it;

k) provision of temporary administration[16] in the case of radioactive waste that, under a specific Act[17], has become State property; if these are items that were found, left or hidden[18], the Authority is entitled also to accept them, instead of a State body determined by a specific Act[19].

(4) The Authority shall operate on the bases of a statute approved by the Government, a budget, and one-year, two-year and long-term plans for its activities. The Authority shall provide for the activities referred to in para 3 a), b) and c), chiefly by selecting suppliers on the basis of an assessment of nuclear safety, radiation protection and economic benefit. The Authority shall perform activities under para 3 i) of this Act solely in connection with its other activities.

(5) The Ministry of Finance shall transfer financial resources from the nuclear account to a special account of the Authority according to the plan of activities and budget for the Authority approved by the Government.

(6) The Authority shall exercise the right to manage State property, maintaining an appropriate accounting system[20]. The Authority shall not have its own property. The Authority shall not depreciate fixed assets, and shall not create provisions or correction items.

(7) The Authority shall observe a specific Act[21] in placing orders.

(8) The resources of the Authority shall be subject to annual clearing with the nuclear account. The Authority shall transfer income from its own activities to the nuclear account and is authorised to mediate payments to this account.

(5) Under Section 27, the Authority statute establishes the method of financial clearing to the nuclear account and other management details, and defines which property the Authority has the right to manage at the time of its establishment.

(6) The Authority shall create a cultural and social needs fund under a specific regulation[22].

Section 27

(1) The income to the nuclear account shall specifically comprise

a) payments from radioactive waste generators;

b) interest from the nuclear account;

c) revenues from operations with nuclear account resources on the financial market;

d) income received and payments mediated by the Authority;

e) subsidies, gifts, grants and other income.

(2) Generators shall allocate to their own debit[12] financial provisions to cover expenses for disposal of

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16 Article 761 para 1 of Act No 513/1991 Coll., the Commercial Code, in the wording of subsequent regulations.

17 E.g. Article 135 of Act No. 40/1964 Coll., the Civil Code, in the wording of subsequent regulations.

18 Article 135 para 1 and para 3 of Act No. 40/1964 Coll., in the wording of subsequent regulations.

19 Article 13 of Act No. 102/1992 Coll., amending certain matters relating to the promulgation of Act No. 509/1991 Coll., which amends and supplements the Civil Code.

20 Act No. 563/1991 Coll., on Accountancy, in the wording of Act No. 117/1994 Coll.

21 Act No. 199/1994 Coll., on Public Procurement, in the wording of Act No. 148/1996 Coll.

22 Decree of the Ministry of Finance No 310/1995 Coll., on the Cultural and Social Needs Fund.

radioactive waste which have been arising or will arise and for associated activities of the Authority. These financial resources shall be accumulated in the nuclear account in the form of payments. Unless otherwise specified in this Act, the payments shall be suitably administered subject to a specific Act[23].

(3) The amount of payments shall be determined on the basis of the estimated costs of activities provided by the Authority and of the proportion of the total amount of waste attributable to the individual radioactive waste generators in respect of specific activities of the Authority three years in advance and related to the one-year plan, three-year plan and long-term plan of activity of the Authority.

(4) The balance of the nuclear account run as State financial assets may be invested on the financial market, but only in liquid government bonds, bonds of the Czech National Bank, State guaranteed bonds, or in securities of issuers whose rating level granted by a rating agency selected by the Ministry of Finance is at least as good as that of the Czech Republic. The Ministry of Finance may carry out financial investment through the intermediary of other persons. The manner of investment and its profitability shall be subject to supervision by the Ministry of Finance.

(5) The amount and method of payments to the nuclear account, especially the payment basis, payment rate, payment period, payment due, submission of a payment return form and payment advances, together with the manner of their administration, including the way payer records are kept, and details of nuclear account management shall be established in a governmental order. In this order, the Government shall establish an annual amount of and rules for providing contributions to municipalities on their cadastral areas radioactive waste repositories be located and principles enabling generators of a small amount of radioactive waste to pay payments by means of refunding the costs of its disposal credited to the nuclear account through the medium of the Authority.

(6) In the event that radioactive waste is safely disposed of so that the costs of the Authority for activities relating to waste from the generator in question do not reach the expected amount, and the generator has terminated his activities associated with radioactive waste generation, the Government, as part of the Authority budget approval process, shall decide on reimbursement of unused resources to this generator.

Section 28

(1) The State shall provide financial resources to the Authority for activities performed under Section 26 para 3 j) and k) and to manage radioactive waste disposed of subject to regulations effective prior to this Act coming into force.

(2) The State may provide a subsidy to eliminate old radiation burdens, namely for

a) disposal of radioactive waste which arose prior to privatisation[24] of its generators;

b) elimination of radioactive environmental contamination that occurred before privatisation[24] of its generators;

c) elimination of radioactive waste which arose from substances or items contaminated by radionuclides before the time of privatisation[24] of its generators to the extent of a proportional share of the costs;

d) decommissioning of installations commissioned before their privatisation[24], including the cost of necessary research and development work to the extent of a proportional share of the costs;

e) identification of risks arising from the presence of indoor radon and its daughter products, and taking intervention measures demonstrably justified under Section 6 para 5.

A subsidy may be provided on the basis of an application reporting circumstances as specified in points a) to e).

Section 29

(1) The bodies of the Authority shall be the Board and the Director. The Director shall be a statutory body of the Authority. The Director shall be a person of probity under Section 11 and fulfil requirements

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23 Act of the Czech National Council No 337/1992 Coll., on Tax Administration and Collection, in the wording of subsequent regulations.

24 Act No. 92/1991 Coll., on Conditions of Transfer of State-Owned Property to Other Persons, in the wording of subsequent regulations.

verified as established in a specific Act[9], shall be competent to perform legal acts, university graduate and at least 6 years of expert experience.

(2) The Board members and the Director shall be appointed and dismissed by the Minister of Industry and Trade (hereinafter referred to as "the Minister").

(3) The Board shall comprise 11 members. The Board shall comprise representatives of State administration bodies, generators of radioactive waste and the public. Four persons shall be representatives of radioactive waste generators and four persons shall represent the public. Membership of the Board membership shall be a public function[25].

(4) A Board member may only be a person of probity under Section 11, and competent to perform legal acts. A Board member may not be in an employer-employee or similar relation to the Authority. The period for Board membership shall be 5 years.

(5) The Board shall

a) supervise the management and efficiency of use of resources spent on activities provided for and performed by the Authority, notify the Authority Director and the Minister of identified discrepancies and propose remedial measures;

b) recommend to the Minister the one-year, three-year and long-term plans of activity and the budget of the Authority for submission to the Government;

c) assess implementation of the one-year plan of activity and spending of the budget and arrange an audit of the annual financial Statement of the Authority;

d) recommend to the Minister the dismissal or appointment of the Authority Director and, if need be, organisational changes to the Authority or changes to its statute;

e) recommend to the Minister proposals for determination of payments to the nuclear account.

(6) The Director shall be entitled to participate at Board meetings on a non-voting basis.

Section 30

(1) On the basis of a proposal from the Authority, the Minister shall submit the following issues for approval to the Government

a) the one-year plan of activity of the Authority, including the annual budget;

b) the three-year plan of activity of the Authority, including expected income and expenditure, together with the long-term plan of activity of the Authority and with an estimate of forecast income and expenditure;

c) the annual report of the Authority, including the annual financial Statement verified by the auditor and an analysis of the effectiveness of utilisation of resources;

d) the Authority statute;

e) a draft government ordinance concerning determination of payments to the nuclear account on the basis of a proposal under Section 26 para 3 f).

(2) In the event of a hazard arising from delay in approving the Authority's one-year plan of activity and its budget, the Minister shall be entitled to approve a provisional one-year plan and budget for the Authority on the basis of which, the Authority shall perform its activities until the plan and budget are approved by the Government.

Section 31

(1) The Authority shall accept radioactive waste from a generator in the event that the waste meets acceptance criteria for waste disposal (hereinafter referred to as "acceptance criteria").

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25 Article 124 para 1 and para 2 of Act No. 65/1965 Coll., the Labour Code, in the wording of subsequent regulations.

(2) The criteria for take over of the waste for disposal and criteria for payments to the nuclear account, including penalties, shall be regulated by an agreement concluded between the generator and the Authority.

(3) The acceptance criteria shall be established by the Office in the operating licence for particular repositories, subject to an assessment performed by the Authority of submitted safety analyses from the aspect of nuclear safety, radiation protection, physical protection and emergency preparedness.

(4) The Authority shall accept radioactive waste or handle radioactive waste subject to a decision of the Office under Section 3 para 2 u), even in case where the waste does not meet the acceptance criteria. In such cases, the Authority shall make provision, at the expense of the generator, to have the waste conditioned into a form meeting the acceptance criteria for a repository or for safe storage of such waste until conditions are created for a final solution to the problem.

(5) Compensation claims for radioactive waste management costs shall lapse three years from the date of identification of the radioactive waste generator, but not later than twenty years from the date on which the Authority accepted the radioactive waste for disposal.

(6) On the date the Authority accepts radioactive waste from its generator, the waste shall pass into the ownership of the State. The Authority and the generator shall confirm acceptance of the radioactive waste in writing.

CHAPTER FIVE

CIVIL LIABILITY FOR NUCLEAR DAMAGE

Section 32

(1) The provisions of the international agreement[26], which is legally binding on the Czech Republic, shall be applied for the purposes of civil liability for nuclear damage.

(2) The provisions of general legal regulations[27],[28] concerning liability for nuclear damage shall be applied only unless otherwise provided for by the international agreement[26] or this Act.

Section 33

(1) The licensee licensed for operation of nuclear installation[29] or performing any practice related to nuclear installation utilisation, or licensed for nuclear material transport[30] shall be the operator[31] liable for nuclear damage[32] under the international agreement[26] which is legally binding on the Czech Republic.

(2) In the event that a single person has been licensed for a number of nuclear installations located within an area, and for which a joint on-site emergency plan has been approved, these installations shall be considered, for the purposes of liability for nuclear damage, as a single nuclear installation. However, a number of nuclear installations for which different persons have been licensed cannot be considered as a single nuclear installation, from the aspect of liability for nuclear damage, even if such installations are directly linked.

Section 34

(1) In determining the extent and manner of compensation for nuclear damage, provisions of general legal

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26 The Vienna Convention on Civil Liability for Nuclear Damage and the Joint Protocol Relating to the Application of the Vienna and Paris Conventions, published under No. 133/1994 Coll.

27 Act No. 40/1964 Coll., in the wording of subsequent regulations.

28 Article 5 para 2 of Act of the Czech National Council No. 425/1990 Coll., on Local Authorities, their Competence and Some Other Related Measures, in the wording of Act No. 254/1994 Coll.

29 Vienna Convention on Civil Liability for Nuclear damage, Article I (1) j).

30 Vienna Convention on Civil Liability for Nuclear Damage, Article I (1) h).

31 Vienna Convention on Civil Liability for Nuclear Damage, Article I (1) c).

32 Vienna Convention on Civil Liability for Nuclear damage, Article I (1) k).

regulations on liability for damage[27] shall be applied. To determine the amount of damage, legal regulations effective at the time of occurrence of the nuclear event[33] that caused the nuclear damage shall be applied.

(2) Nuclear damage shall also be damage arising in the form of costs of interventions necessary to prevent or reduce exposure or restore the original or equivalent State of the environment, if these interventions were made necessary by a nuclear event and the nature of the damage thus permits.

(3) An implementing regulation shall set limits for concentrations and quantities of nuclear materials to which, under the international agreement[34], the provisions on nuclear damage do not apply.

Section 35

The liability of a licensee for nuclear damage caused by each single nuclear event shall be limited in the case of

a) nuclear installations used for power generation purposes[35], storage facilities and repositories of spent nuclear fuel assigned to these installations, or nuclear materials generated by processing of this fuel, to the sum of CZK 6,000 million;

b) other nuclear installations and shipments, to the sum of CZK 1,500 million.

Section 36

(1) A licensee under Section 33 shall arrange insurance covering his liability for nuclear damage with an insurer suitably authorised by a specific Act[36], if no other financial security is stipulated to cover the nuclear damage liability.

(2) The Ministry of Finance, by agreement with the Office and with the Ministry of Industry and Trade, shall determine, by way of a decision granting an exception from the provision of par. 1, in the interest of efficient employment of State funds, which licensee shall be required to have alternative type of financial cover of liability for nuclear damage instead of insurance covering his liability for nuclear damage.

(3) The insured sum in cases under Section 35 a), shall not be less than CZK 1,500 million, and in cases under Section 35 b), shall not be less than CZK 200 million.

(4) Insurance shall be arranged or other financial security established separately for each nuclear installation or nuclear material transport within the meaning of Section 33 para 2.

(5) Detailed insurance policy conditions shall be established in the general insurance conditions of the insurer, as approved by the State insurance supervisory authority. Detailed conditions of other financial security shall be established by the Ministry of Finance.

Section 37

(1) The State undertakes to settle acknowledged claims for compensation of nuclear damage, if they are not reimbursed from the mandatory insurance or financial security otherwise established, up to a sum of

a) CZK 6,000 million over and above the sum paid by the insurer in the sum of CZK 1,500 million, in cases of installations under Section 35 a);

b) CZK 1,500 million over and above the sum paid by the insurer in the sum of CZK 200 million, in cases of installations under Section 35 b).

(2) The right of recourse of the State as guarantor for settlement of acknowledged claims for compensation of nuclear damage against the licensee is not affected.

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33 Vienna Convention on Civil Liability for Nuclear Damage, Article I (1) l).
34 Vienna Convention on Civil Liability for Nuclear Damage, Articles I (2).
35 Act No. 222/1994 Coll.
36 Act of the Czech National Council No. 185/1991 Coll., on Insurance, in the wording of subsequent regulations.

Section 38

(1) The right to indemnification for nuclear damage shall expire if a claim for compensation is not made within three years of the date on which the person suffering nuclear damage had knowledge or should have had knowledge of the event that caused the nuclear damage and of who was liable, but not later than ten years after the occurrence of this event, or after expiry of the insurance, if the validity of the insurance was longer.

(2) In case of a nuclear event occurring, a licensee shall issue written notification, in the region affected by the event as identified by the Office on the basis of National Radiation Monitoring Network activities under Section 3 para 2 j), stating his liability for nuclear damage caused by this event. This written notification shall be accessible to the public at the premises of the licensee and at the Regional Authority and all Municipal Authorities within this region.

CHAPTER SIX

STATE SUPERVISION AND PENALTIES

Section 39
Supervising Activities

(1) The Office shall check compliance with this Act and subsequent regulations issued pursuant to it. The Office shall carry out inspections at the premises of persons granted a licence under Section 9 para1, or registered under Section 21 para 2, at the premises of persons performing activities related to nuclear energy utilisation and radiation activities not requiring either a licence or a registration, at the premises of persons responsible for preparation or implementation of remedial actions to reduce exposure to natural radioactive sources or exposure due to radiation incidents, and at the premises of persons where there is a reason to believe that they utilise nuclear energy or perform radiation activities without authorisation, and at the premises of persons who are justifiably suspicious that they breach of obligations from international treaties binding on the Czech Republic, and at premises of manufacturers and suppliers of building materials and water.

(2) The Office´s staff responsible for the inspection shall be inspectors of nuclear safety and inspectors of radiation protection (hereinafter referred to as „inspectors "). Inspector shall be only person competent to perform legal acts, who are university graduates in a relevant field and have three years of professional experience. An inspector shall be professionally competent in matters under his supervision, shall be a person of probity under Section 11 and competent in respect to security under a specific legal regulation [9] in case of performing sensitive activities under a specific legal regulation.[9a] The inspectors shall be appointed by the Chairman of the Office.

(3) Inspectors shall check whether the persons referred to in para 1 are observing provisions of this Act and implementing regulations, and whether they are keeping to the subject and scope of the issued licence, including specified conditions.

(4) Within the framework of their inspection activities, inspectors, and also the Chairman of the Office, are authorised, in addition to the rights arising from specific regulations[37], to

a) enter at any time facilities, installations, operational areas, territories and other workplaces of inspected persons where activities related to nuclear energy utilisation or practices resulting in exposure are being carried out;

b) check the compliance with requirements and conditions of nuclear safety, radiation protection, physical protection and emergency preparedness and inspect the nuclear installation conditions, adherence to limits and conditions and service regulations;

c) demand evidence of fulfilment of all set of obligations for the provision of nuclear safety, radiation protection, physical protection and emergency preparedness of nuclear installations;

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[37] Act of the Czech National Council No 552/1991 Coll., on the State Inspection and Monitoring, in the wording of Act No 166/1993 Coll.

d) take measurements and collect samples at the premises of inspected persons such as are necessary for checking the compliance with this Act and other regulations issued on its basis;

e) perform a physical inspection of nuclear items or ionising radiation sources, including the checking of their records;

f) verify professional competence and special professional competence under this Act;

g) participate in investigations and clean-up of events with an impact on nuclear safety, radiation protection, physical protection and emergency preparedness, including unauthorised handling of nuclear items or ionising radiation sources.

(5) According to the international treaty[2] which is legally binding on the Czech Republic, inspectors of the International Atomic Energy Agency are also authorised to perform a physical inspection of nuclear items and an inspection of their accountancy for, provided they are accompanied by inspectors of the Office. Verification of fulfilment of the obligations under the Comprehensive Test Ban Treaty shall be performed by the inspectors appointed hereunder. The manner of inspection shall be governed by the provisions hereof.

(6) Unless otherwise stated in this Act, the procedure for inspection activities shall be governed by a specific Act[37].

Section 40
Remedial Measures

(1) Should an inspector identifies deficiencies at the premises of an inspected person, he is authorised, depending on the nature of the identified discrepancy, to

a) require the inspected person to remedy the situation, within a set time period;

b) charge the inspected person to perform technical inspections, reviews or testing of operating condition of the installations, their parts, system or their assemblies, if necessary for verification of nuclear safety, radiation protection, and further to monitor and implement remedial actions for reducing or mitigation of lasting exposures;

c) withdraw the special professional competence authorisation issued to an employee of the inspected person, in the event of a serious violation of his obligations or his not fulfilling requirements of professional competence and physical and mental capability;

d) propose the imposition of a penalty.

(2) The Office is authorised, in the event of a hazard arising from delay or an occurrence of undesirable situations with an impact on nuclear safety, radiation protection, physical protection and emergency preparedness, to issue a provisional measure[38] imposing on the inspected person the obligation to reduce the power output or suspend operation of the nuclear installation, suspend an installation of components or systems of nuclear installations. Further it is authorised to prohibit the handling of nuclear items, ionising radiation sources or radioactive waste, or impose on the inspected person to suffer the imposition of management by another person, at the expense of the inspected person.

Section 41
Penalties

For violation of a legal obligation established in this Act, the Office shall impose a penalty, up to the sum of

a) CZK 100 million on those who violate the prohibition on nuclear energy utilisation for other than peaceful purposes under Section 4, or the prohibition under Section 5 para1;

b) CZK 50 million on a person performing activities under Section 9 para1, without a licence;

c) CZK 10 million on a licensee violating an obligation under Sections 17 to 20;

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[38] Article 43 of Act No 71/1967 Coll., on Administrative Proceedings (the Administrative Code).

d) CZK 10 million on a person violating the prohibition on importation of radioactive waste for disposal under Section 5 para 2 and not fulfilling the obligation of providing payments to the nuclear account under Section 27, or the obligation of disposal of radioactive waste by an authorised person only, under Section 26 and Section 48 para 1;

e) CZK 200,000 on natural persons of statutory bodies and CZK 100,000 on employees of an inspected person for distortion or concealment of facts important for performance of an inspection or for non-co-operation during an inspection;

f) CZK 1 million for failure to fulfil other obligations imposed by this Act.

Section 42

(1) A penalty under Section 41 may be imposed within three years of the date on which the Office identified the violation of an obligation, but no later then 10 years after the occurrence of the violation.

(2) The amount of the penalty shall reflect the seriousness, significance and time period of the illegal activity and the extent of consequences that were caused, and early and efficient co-operation in removing the deficiencies. In the event that the deficiencies are removed immediately following the identification of the breach of the obligations and the Office has been provided with efficient co-operation, and neither persons nor the environment have suffered any damage, the Office may decide to refrain from imposing a penalty.

(3) The Office shall not instigate an administrative proceedings or stay an initiated proceedings concerning an imposing a penalty with natural person if the administrative offence was committed concurrently with its criminal activity and legitimate decision has been made a body active in criminal proceedings. In case a criminal proceeding has been only initiated, the Office shall stay administrative proceedings. For a term of criminal proceeding the term pursuant to Section 42 shall not run.

(4) The Office shall collect penalties imposed under Section 41. Penalties shall constitute an income to the State budget.

PART II

Repealed

Section 43

Repealed

PART III

AMENDMENTS TO ACT NO. 283/1991 COLL. OF THE CZECH NATIONAL COUNCIL, ON THE POLICE OF THE CZECH REPUBLIC, IN THE WORDING OF SUBSEQUENT REGULATIONS

Section 44

Act No. 283/1991 Coll. of the Czech National Council, on the Police of the Czech Republic, in the wording of Act No. 26/1993 Coll., Act No. 67/1993 Coll., Act No. 163/1993 Coll., Act No. 326/1993 Coll., Act No. 82/1995 Coll., and Act No. 152/1995 Coll., is amended as follows:

In Section 2 para 1 o), the full stop shall be replaced by a semicolon, and a new point p) be inserted, in the following wording, including note 2a:

"p) shall provide emergency protection of nuclear installations, as determined by the Government of the Czech Republic, and shall participate in physical protection of nuclear materials during their shipment, subject to a specific Act.[2a)]

2a) Act No. 18/1997 Coll. on Peaceful Utilisation of Nuclear Energy and Ionising Radiation (the Atomic Act), and on Alterations and Amendments to Some Acts."

PART IV

AMENDMENT TO ACT NO. 586/1992 COLL. OF THE CZECH NATIONAL COUNCIL, ON INCOME TAXES, IN THE WORDING OF SUBSEQUENT REGULATIONS

Section 45

Act No 586/1992 Coll. of the Czech National Council, on income taxes, in the wording of Act No 35/1993 Coll. of the Czech National Council, Act No 96/1993 Coll., Act No 157/1993 Coll., Act No 196/1993 Coll., Act No 323/1993 Coll., Act No 42/1994 Coll., Act No 85/1994 Coll., Act No 114/1994 Coll., Act No 259/1994 Coll., Act No 32/1995 Coll., Act No 87/1995 Coll., Act No 118/1995 Coll., Act No 149/1995 Coll., Act No 248/1995 Coll. and Act No 316/1996 Coll., is amended as follows:

In Article 18 para 2 letter b), the full stop is replaced by a colon and a new letter c) including note 19e) is inserted, in the following wording:

"c) income from own activities of the Radioactive Waste Repository Authority[19e]), excluding income subject to a special tax rate under Section 36 of this Act.

19e) Act No. 18/1997 Coll. on peaceful utilisation of nuclear energy and ionising radiation (the Atomic Act), and on alterations and amendments to related legislation.".

PART V

GENERAL, TEMPORARY AND FINAL PROVISIONS

Section 46

Tasks and Obligations of Central State Administrative Bodies in Emergency Preparedness

(1) For the requisite of the Radiation Monitoring Network on the Czech Republic territory

a) the Ministry of Finance shall ensure operation of specified parts of monitoring points at border crossings and participate in operation of mobile monitoring groups;

b) the Ministry of Defence shall participate in operation of Early Warning Network, monitoring points at roadblocks and border crossings, operation of mobile monitoring groups and aircraft monitoring groups and shall ensure means of aerial survey;

c) the Ministry of Interior shall participate in operation of mobile groups;

d) the Ministry of Agricultural shall participate in operation of water contamination monitoring points and foodstuffs contamination monitoring points;

e) the Ministry of Environment shall ensure meteorological support and shall participate in operation of the Early Warning Network, air contamination monitoring points and water contamination monitoring points.

Implementing legal regulation shall establish a system of data transfer.

(2) For purposes of emergency preparedness support the Ministry of Interior shall provide for a system of notification and warning.

(3) The Ministry of Health shall create a system of special medical care provided by selected clinics to persons irradiated in the course of radiation accidents.

Section 46 a

To assure protection against exposure to natural sources Regional Authorities shall participate in identification of buildings with an increased level of exposure to natural radionuclides in their indoor atmosphere, in distribution of subsidies, under Section 28 paragraph 2, to take recovery measures in the buildings and waters for public supply and in a follow-up of efficiency of implemented recovery measures. The details are established in an implementing legal regulation.

Section 46 b

Competencies assigned to Regional Authority, Municipal Authority of Municipality with extended competence or Municipal Authority hereunder represent execution of delegated competencies.

Section 47

General and Temporary Provisions

(1) Proceedings under this Act shall be governed by general legal regulations [37,39], unless otherwise specified by this Act.

(2) Persons disposing of radioactive waste on the basis of licences granted under Act No. 28/1984 Coll., on State Nuclear Safety Supervision for Nuclear Installations, or under Decree No. 59/1972 Coll. of the Health Ministry of the Czech Socialist Republic, on Health Protection from Ionising Radiation, shall be authorised to perform this activity until such time as the radioactive waste repositories are transferred to the Authority under Section 48 para 1.

(3) Persons performing activities regulated by this Act on the basis of a licence or approval granted under Act No. 28/1984 Coll., on State Nuclear Safety Supervision of Nuclear Installations, shall, within 1 year of this Act entering into force, accommodate their legal relations to the requirements Stated under Section 18 para 1e) and Section 36, and within 2 years of this Act entering into force, to the requirements Stated under Section 17 para 1i) and under Section 18 para 1m) and n), and to other requirements of this Act within 5 years of this Act entering into force, with the exception of Section 48, where the obligation enters into effect on the date of opening of the nuclear account. On expiry of the time periods mentioned above, the original licence or approval ceases to be valid.

(4) The validity of an authorisation to manage ionising radiation sources granted under Decree No. 59/1972 Coll. of the Health Ministry of the Czech Socialist Republic, on Health Protection from Ionising Radiation, shall terminate on expiry of the period for which it was issued, but no later than five years from the date that this Act enters into force.

(5) Proceedings not completed prior to this Act entering into force shall be completed under the legal regulations effective at the time of their commencement.

(6) Emergency planning zones established before this Act entered into force shall be considered as emergency planning zones established in this Act.

(7) The Office shall issue regulations to implement Sections 2, 3, 4, 6, 7, 8, 9, 13, 14, 17, 18, with the exception of para 1h), Sections 20, 22, 23, 24, 34, 46 and points A.I.1, A.I.2, B.I.1, D. b) 4, I.6, I.7, I.8, I.12, I.13 and P. of the Appendix.

(8) The Ministry of Industry and Trade, by agreement with the Office, shall establish by legal regulation specific requirements to ensure uniformity and correctness of measuring devices and measurements

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39 Act No. 71/1967 Coll.

performed as part of activities related to nuclear energy utilisation, and practices resulting in irradiation.

(9) The Ministry of Industry and Trade, by agreement with the Office and the Ministry of Finance shall issue an implementing legal regulation to Section 18 para 1h).

(10) The Ministry of Finance after discussion with the Ministry for Regional Development and the Office shall issue implementing legal regulation to Section 46a.

(11) The Ministry of Defence shall, within the framework of its scope of power to perform a state supervision over the radiation protection in military premises, adopt measures to remove found shortcomings and provide the Office with information important from radiation protection viewpoint.

(12) For the purposes of a special legal regulation[39a] the exposure to ionising radiation, including significantly increased exposure to natural sources, shall be considered a risk factor in working conditions at workplaces and requirements of the special legal regulation[39a] shall apply to work in controlled areas, unless provided otherwise herein. Activities with ionising radiation sources which may be performed only by A category workers and activities performed while supervising nuclear safety and radiation protection shall in agreement with a special legal regulation[39b] be considered the activities of the second category and risk activities. The other activities with ionising radiation sources shall be considered activities of the first category.

Section 48

(1) Radioactive waste repositories operated until the present time by other persons than the Authority shall be transferred within 3 years of this Act entering into force into the ownership of the State and entrusted to the Authority, with the exception of repositories in the form of dumps, tailings dumps or spoil heaps originating from mining, containing radioactive waste or created by mining operations with radioactive waste used as part of their filling,

a) if operated by a State enterprise[40], and within three years of the date that this Act enters into force a licence is granted to this enterprise by the Office under Section 9 j);

b) if their owner, within three years of the date that this Act enters into force, concludes a contract with the Authority to ensure radiation protection; or

c) where measures to reduce radioactive contamination are not justified by benefits as in Section 6 para 2.

(2) A State enterprise[40], the founder of which has declared a attenuation programme, is not obliged to establish a decommissioning provision under Section 18 para 1h).

Section 49

Final Provisions

The following are repealed:

1. Act No 287/1993 Coll. on Competence of the State Office for Nuclear Safety, in the wording of Act No. 85/1995 Coll.

2. Act No 28/1984 Coll. on State Supervision of Nuclear Safety at Nuclear Installations.

3. Decree No 59/1972 Coll. of the Health Ministry of the Czech Socialist Republic, on Protection of Health from Ionising Radiation.

[39a] Article 134c of Act No. 65/1997 Coll., Labour Code, in the wording of subsequent regulations.

[39b] Act No. 258/2000 Coll., in the wording of subsequent regulations.

[40] Act No 111/1990 Coll., on State Enterprises, in the wording of subsequent regulations.

4. Decree No 28/1977 Coll. of the Czechoslovak Atomic Energy Commission, on Accountancy for and Control of Nuclear Materials, in the wording of Decree No. 100/1989 Coll.
5. Decree No 67/1987 Coll. of the Czechoslovak Atomic Energy Commission, on Nuclear Safety Assurance in Radioactive Waste Management.
6. Decree No 100/1989 Coll. of the Czechoslovak Atomic Energy Commission, on Physical Protection of Nuclear Installations and of Nuclear Materials.
7. Decree No 191/1989 Coll. of the Czechoslovak Atomic Energy Commission, which establishes methods, terms and conditions for verification of special professional competence of selected personnel at nuclear installations.
8. Decree No 436/1990 Coll. of the Czechoslovak Atomic Energy Commission, on Quality Assurance at Selected Installations with Regard to Nuclear Safety of Nuclear Installations.
9. Decree No 76/1991 Coll. of the Health Ministry of the Czech Republic, on Reduction of Exposure from Radon and Other Natural Radionuclides.
10. Directive No 2/1978 of the Czechoslovak Atomic Energy Commission, on Nuclear Safety Assurance in the Process of Nuclear Power Installations Designing, Licensing and Construction (registered in section 28/1987 Coll.).
11. Directive No 4/1979 of the Czechoslovak Atomic Energy Commission, on General Criteria for Nuclear Safety Assurance in the Process of Nuclear Power Installations Siting (registered in Section 9/1979 Coll.).
12. Directive No 6/1980 of the Czechoslovak Atomic Energy Commission, on Nuclear Safety Assurance in the Process of Nuclear Power Installation Commissioning and Operation (registered in Section 13/1980 Coll.).
13. Directive No 8/1981 of the Czechoslovak Atomic Energy Commission, on Testing of Equipment for Shipment and Storage of Radioactive Materials (registered in Section 20/1981 Coll.).
14. Directive No 9/1985 of the Czechoslovak Atomic Energy Commission, on Nuclear Safety Assurance for Nuclear Research Installations (registered in Section 11/1985 Coll.).

Section 50

This Act shall enter into force on 1 July 1997, except for Sections Four and Five and Section 48, which come into force on the day of its promulgation.

Appendix

Content of the Documentation Required for Issue of a Licence for Individual Activities under Section 13 para 3 d) of this Act

A. Documentation for the issue of a licence for siting of a nuclear installation or radioactive waste repository

I. Initial Safety Report which shall include

1. Description and evidence of suitability of the selected site from the aspect of siting criteria for nuclear installations or radioactive waste repositories as established in a legal implementing regulation;
2. Description and preliminary assessment of design conception from the aspect of requirements laid down in an implementing regulation for nuclear safety, radiation protection and emergency preparedness;
3. Preliminary assessment of impact of operation of proposed installation on personnel, the public and the environment;
4. Proposal of conception for safe termination of operation;
5. Assessment of quality assurance in process of selection of site, method of quality assurance for preparatory stage of construction and quality assurance principles for linking stages.

II. Analysis of needs and possibilities of physical protection.

B. Documentation for the issue of a licence for construction of a nuclear installation or a category IV workplace

I. Preliminary Safety Report which shall include

1. Evidence that the proposed design meets all requirements for nuclear safety, radiation protection and emergency preparedness as laid down in an implementing regulations;
2. Safety analyses and analyses of the potential unauthorised handling of nuclear materials and ionising radiation sources, and an assessment of their consequences for personnel, public and environment;
3. Information on predicted lifetime of nuclear installation or very significant ionising radiation source;
4. Assessment of nuclear waste generation and management of it during commissioning and operation of the installation or workplace being licensed;
5. Conception of safe termination of operation and decommissioning of the installation or workplace being licensed, including disposal of nuclear waste;
6. Conception for spent nuclear fuel management;
7. Assessment of quality assurance during preparation for construction, method of quality assurance for the carrying out of construction work and principles of quality assurance for linking stages;
8. List of classified equipment.

II. Proposed method of providing physical protection.

The documentation specified under I.8 and II shall be subject to approval by the Office.

C. Documentation for the issue of a licence for individual stages of nuclear installation commissioning

a) For stages prior to loading nuclear fuel into a reactor

1. Time schedule for work in a given stage;
2. Programme for the stage in question;
3. Evidence that installation and personnel are prepared for the stage in question;
4. Evaluation of results of the preceding stage;
5. Method by which physical protection is to be provided.

b) For the first loading of nuclear fuel into a reactor

I. Pre-operational Safety Report which shall include

1. Description of changes to original design assessed in the Preliminary Safety Report and evidence that there has been no decrease in the level of nuclear safety of the nuclear installation;
2. Supplementary and more precise evidence of nuclear safety and radiation protection provisions;
3. Limits and conditions for safe operation of the nuclear installation;
4. Neutron-physics characteristics of the nuclear reactor;
5. Method of radioactive waste management;
6. Quality assessment of classified equipment;

II. Further documentation which shall include

1. Evidence that all prior decisions and conditions of the Office were fulfilled;
2. Time schedule for nuclear fuel loading;
3. Programme for nuclear fuel loading;
4. Evidence that installation and personnel are prepared for nuclear fuel loading;
5. Evaluation of the result of previous stages;
6. On-site emergency plan;
7. Changes in the provision of physical protection;
8. Programme of operational inspections;
9. Proposed decommissioning method;
10. Cost estimate for decommissioning as in II.9, verified by the Authority.

c) For stages following the first nuclear fuel loading into the reactor

1. Time schedule for work in this stage;
2. Programme of this stage;
3. Evidence that installation and personnel are prepared for the stage in question;
4. Evaluation of results of the previous stage.

d) For a trial operation stage of the radioactive waste repository

I. Pre-operational Safety Report which shall include

1. Description of changes to the original design assessed in the Preliminary Safety Report and evidence that the level of nuclear safety of the nuclear installation has not been decreased;
2. Supplementary and more precise evidence of nuclear safety and radiation protection

maintenance;

3. Limits and conditions for safe operation of the nuclear installation;
4. Method of radioactive waste management;
5. Quality assessment of selected equipment;

II. Further documentation which shall include

1. Time schedule of activities;
2. Programme of activities;
3. Evidence of implementation of previous decisions and conditions of the Office
4. Evidence that installation and personnel are prepared;
5. Methods of physical protection maintenance;
6. On-site emergency plan;
7. Programme of in-service inspections.

Documentation as specified under a), items 2 and 5, under b), items I.3, II.6 to II.9 and under c), item 2 and under d) items I.3, II.5 and II.6 shall be subject to approval by the Office. The Office may open proceedings even if documentation as in II.4 is not submitted.

D. Documentation for the issue of a licence for nuclear installation or category III or IV workplace

a) For the issue of a licence for nuclear installation operation

1. Supplements to the Pre-operational Safety Report and further supplements to documentation required for the issue of a licence for the first nuclear fuel loading into the reactor, relating to changes carried out after the first nuclear fuel loading;
2. Evaluation of results of previous commissioning stages;
3. Evidence of implementation of previous decisions and conditions of the Office;
4. Evidence that installation and personnel are prepared for operation;
5. Operation time schedule;
6. Up-dated limits and conditions for safe operation.

b) For the issue of a licence for a category III or IV workplace

1. Expected extent and manner of activities with ionising radiation sources at the workplace, specification of radiation sources to be managed, their types and fixtures and fittings;
2. Description of status of building and installation activities, evidence of the effectiveness of shielding, insulation and protective equipment permitting to start radiation activities;
3. Evidence of radiation protection optimisation (Section 4 para 4 of this Act);
4. Programme of monitoring in the extent specified in an implementing legal regulation;
5. Proposal of controlled area delineation, assumed number of persons working in the area and a method of preventing unauthorised persons from entering the area;
6. On-site emergency plan;
7. Evidence of special professional competence of workers performing activities important from radiation protection viewpoint;
8. Assumed types and quantities of released radionuclides and assumed types and quantities of generated radioactive wastes and methods of their disposal;
9. Proposal of a decommissioning method and estimated costs of such decommissioning verified by the Administration;

Documentation as specified under a) item 6 and under b) items 4, 5 and 6 shall be subject to approval by the Office. The Office may open the proceedings even if documentation as in a) item 4 is not submitted.

E. Documentation for the issue of a licence for restart of a nuclear reactor to criticality following a nuclear fuel reload

1. Neutron-physics characteristics of the reactor;
2. Evidence that installation and personnel are prepared for restart of the nuclear reactor to criticality, including preliminary evaluation of in-service inspections;
3. Time schedule for subsequent operation.

The Office may open proceedings even if documentation under item 2 is not submitted.

F. Documentation for the issue of a licence for reconstruction or other changes impacting on nuclear safety, radiation protection, physical protection or emergency preparedness of nuclear installation or category III or IV workplace

1. Description and justification of prepared reconstruction or other changes;
2. Up-date of documentation approved for commissioning and operation of nuclear installation;
3. Anticipated time schedule for reconstruction or changes;
4. Evidence that the consequences of reconstruction or other changes will not adversely influence nuclear safety, radiation protection, physical protection or emergency preparedness.

Documentation specified under point 2 shall be subject to approval by the Office.

G. Documentation for the issue of a licence for individual stages of decommissioning of a nuclear installation or category III or IV workplace

1. Evidence of availability of finance for decommissioning activities;
2. Description of changes to local area due to nuclear installation operation;
3. Description of technical procedures proposed for decommissioning;
4. Decommissioning time schedule;
5. Method of dismantling, decontamination, conditioning, transport, storage and elimination of parts of installation contaminated by radionuclides;
6. Assumed types and activities of radionuclides discharged into the environment and radioactive waste generated;
7. Method of radioactive waste management, including its disposal;
8. Limits and conditions for safe management of radioactive waste during decommissioning process;
9. Safety analyses;
10. Scope and method of measurement and evaluation of exposure of exposed workers and other persons and contamination of the workplace and its vicinity by radionuclides and ionising radiation;
11. On-site emergency plan;
12. Evidence of provision of physical protection of decommissioned nuclear installation.

Documentation specified under items 8, 10 and 11 shall be subject to approval by the Office.

H. Documentation for the issue of a licence to discharge radionuclides into the environment

1. Justification of discharge of radionuclides into the environment;
2. Types and activities of radionuclides discharged into the environment;
3. Evaluation of exposure of critical group of the population from discharged

radionuclides;

4. Analysis of a possible accumulation of radionuclides in the environment in the case of long-term discharging.

I. Documentation for the issue of a licence for ionising radiation source management

1. Justification of the radiation practice;
2. Specification of radiation sources which are to be managed, their types and fixtures and fittings;
3. Description of the supervised area (Section 4 para 4 of this Act) at a workplace where the sources will be handled (schematic plan), supplemented by information on shielding and protective facilities and equipment of workplaces;
4. evidence of radiation protection optimisation (Section 4 para 4 of this Act);
5. Document on special professional competence of workers performing activities important from radiation protection viewpoint;
6. Monitoring programme in the extent specified in an implementing regulation;
7. In cases specified by an implementing regulation proposal of controlled area delineation, assumed number of personnel working in this area and method of preventing entry of unauthorised persons into this area;
8. On-site emergency plan for management of sources specified in an implementing legal regulation;
9. If release of radionuclides into the environment or generation of radioactive waste is expected then assumed types and quantities of released radionuclides and assumed types and quantities of generated radioactive waste and methods of their disposal;
10. In case of manufacturing or import of sources, specification of types ionising radiation sources to be manufactured or imported, their assumed quantities and schedule of manufacturing or import and evidence of the capability to verify conformity assessment of individual products with a given type;
11. In case of ionising sources distribution or other placing on the market, specification of ionising sources types and expected quantities of individual products;
12. For the performance of tests specified in an implementing legal regulation to evaluate properties of artificial sources, evidence of the capability to measure and verify properties of ionising radiation sources, proposal of applicable methods and procedures, overview of instrumentation and its availability for performance of the proposed services and a concept of metrological testing;
13. If exported, a specification of types of ionising radiation sources to be exported, their expected quantities and export schedule and, for sources specified in an implementing legal regulation, also a document confirmed by a competent authority of the country of the consignee proving that the consignee fulfils all conditions setting for ionising radiation sources management.

Documentation specified under items 6, 7 and 8 shall be subject to approval by the Office.

J. Documentation for the issue of a licence for radioactive waste management

1. Description of equipment and technology used;
2. Information on origin, type, amount, radionuclide structure and activity of radioactive waste;
3. Method of collection, sorting, storage, processing, conditioning and disposal of radioactive waste;
4. Assumed amount of radionuclides released into the environment;
5. Scope and method of measurement (monitoring programme) and evaluation of

exposure of exposed workers and other persons and contamination of workplace and its vicinity by radionuclides and ionising radiation;

6. Safety analyses;

7. On-site emergency plan;

8. Document on the special professional competence of personnel directly manage the working activities with ionising radiation sources and perform other activities especially important from the radiation protection viewpoint;

9. Limits and conditions for safe management of radioactive waste.

Documentation specified under items 5, 7 and 9 shall be subject to approval by the Office.

K. Documentation for the issue of a licence for import or export of nuclear items or for transit of nuclear materials and selected items

a) Documentation required for nuclear materials and selected items

1. If imported, Statement of the user on the purpose of use thereof, including his commitment to enforce application of safeguards, provide physical protection, not to transfer and not to export these items without written agreement by the Office, under the terms arising out of international treaties, agreements and conventions by which the Czech Republic is bound;

2. If exported or during transit thereof, a guarantee from the State into which the nuclear materials or selected items are imported, under the terms arising out of international treaties, agreements and conventions by which the Czech Republic is bound.

b) Documentation required for items of dual use

1. If imported, Statement of the user on the purpose of use thereof and a his commitment not to export these items without written agreement by the Office, under the terms arising out of international treaties, agreements and conventions by which the Czech Republic is bound;

2. If exported, a guarantee by the end user or by the State to which items of dual use are imported, under the terms arising out of international treaties, agreements and conventions by which the Czech Republic is bound.

L. Documentation for the issue of a licence for nuclear materials management

1. Purpose, justification and time interval for nuclear materials management;

2. Specification of type and amount of nuclear materials, including their chemical and physical form and enrichment;

3. Description of handling operations involving nuclear materials with respect to the possibility of their operational losses and/or their consumption;

4. Guidelines for accountancy for and control of nuclear materials;

5. Information necessary for fulfilment of conditions arising out of international treaties, agreements and conventions by which the Czech Republic is bound in the field of accountancy for and control of nuclear materials.

M. Documentation for the issue of a licence for transport of nuclear materials and radioactive substances

1. Transport instructions containing specification of type of transport and proposed route, including an alternative route;

2. Assessment of risks arising from the nature of radioactive content, type of transport and selected route;

3. Emergency rules;

4. Method of radiation protection during transport;

5. Document proving the competence of crew of vehicles transporting hazardous goods,

or evidence of this competence under a specific regulation[14];

6. Document on capability of the means of transport, or evidence of this capability under a specific regulation[14];
7. Proposal for classification of transported nuclear materials into relevant categories from the physical protection aspect;
8. Proposed physical protection arrangements during transport;
9. Evidence of conformity of packaging assemblies with type-approval.

Documentation specified under items 3, 7 and 8 shall be subject to approval by the Office.

N. Documentation for the issue of a licence for expert training of selected personnel

1. Documents establishing the organisational and technical capability of an applicant for expert training of selected personnel;
2. Documents establishing the professional competence of the applicant personnel for expert training of selected personnel;
3. Documents establishing the method of expert training of selected personnel.

Documentation specified under item 3 shall be subject to approval by the Office.

O. Documentation for the issue of a licence for re-importation of radioactive waste originating from material exported from the Czech Republic, for the purpose of its processing (reprocessing)

1. Document establishing origin, type, physical properties and chemical composition of material which was exported and processed outside the territory of the Czech Republic, together with a document stating the total mass of this material;
2. Document on the physical properties of imported radioactive waste and its chemical composition together with a document stating its total mass;
3. Document on the technical process by which the exported material was processed (reprocessed) together with the material balance, which will demonstrate the probable amount of radioactive waste that may arise from the given amount of material through the technological process specified.

P. Documentation for the issue of licence for international transport of radioactive waste

Data about the applicant for transport licence, about the type and method of transport submitted in a form whose sample shall be specified in an implementing legal regulation.

R. Documentation for the issue of the licence for performing personal dosimetry and other services important from radiation protection viewpoint

1. Description of services to be provided and their assumed scope;
2. Description of preparedness of the equipment and personnel;
3. Documents proving special professional competence to perform the services;
4. Specification of employed methods and procedures;
5. Overview of instrumentation and its availability to perform the proposed services;
6. Concept of metrological testing.

Documentation specified under items 4 through 6 is not submitted in the event that the services are not associated with measurement and evaluation of ionising radiation or radionuclides.

S. Documentation for the issue of the licence for adding radioactive substances into consumer products in the process of their manufacture or preparation or for import or export of such products

1. Justification of benefits resulting from addition of radioactive substances into the products;
2. Radionuclide composition and activities of radionuclides added into the individual products;

3. Overall expected volume of the production or the import;
4. Draft of the instructions for use (instructions for safe utilisation of the products by users);
5. Concept of disposal of used products.

PART II TO PART VI OF ACT NO 13/2002 COLL.

(Part I – Article I of the Act No 13/2002 Coll. involves an amendments and alterations to Act No. 18/1997 Coll. and is given in the unabridged version of the Act No 18/1997 Coll. mentioned above)

PART II

TEMPORARY PROVISIONS

Article II

Decisions of Hygienic Service Authority having declared activities performed by A category workers pursuant to Act No 18/1997 Coll. on peaceful utilisation of nuclear energy and ionising radiation (the Atomic Act) and on amendment and alteration of some acts, in wording of subsequent regulations (hereinafter "the Atomic Act) as danger, shall expire the first day of the month following the day of this Act publication.

Article III

1. Persons performing radiation activities specified in Section I of this Act according to licence issued until 30 June 2002 shall be obliged to bring documentation required for licensed activities into the line with requirements pursuant to Section I item 10 and item 11 as for Section 4 para 12 by 30 June 2003. Validity of licences issued under Section 9 para 1 letter d) of the Atomic Act, with the exception of the licence for operation of nuclear installation issued on the bases of documentation required pursuant to item D.a) of the Annex to the Atomic Act, and under Section 9 para 1 letter i) of the Atomic Act, and which entered into force until 30 June 2002, shall expire after the lapse of term for which they were issued, but not later than 30 June 2007.
2. Licensees who create a reserve for decommissioning and whose expenditures on decommissioning exceed 1 billion CZK are obliged, for meeting requirements specified in Section 18 para 1 letter h) of the Atomic Act, to open a blocked account within the period of 6 month after entering of this Section of this Act into force, and financial means, in the extent of reserve created under present legislation, transfer on a blocked account within a period of 5 years after entering of this Section of this Act into force. Licensee who shall not be obliged to create the reserve after entering of this Section of this Act into force, shall dissolve the reserve created under present legislation so that one half be dissolved within the taxation period of the year in which this Section of this Act entered into force and the second part within the taxation period of the following year, unless provided otherwise by special legal regulation.

PART III

AMENDMENT TO THE ACT ON PUBLIC HEALTH PROTECTION

Article IV

Act No 258/2000 Coll on Public Health Protection and on Amendment of Some Related Acts, as amended by Act No 254/2001 Coll and Act No 274/2001 Coll shall be amended as follows:

1. "In Section 37 para 2 in the first sentence after the word "health" the following words, including the notice under line No 33a) are inserted: "unless provided otherwise by special legal provision

[33a] Act No 18/1997 Coll. on Peaceful Utilisation of Nuclear energy and Ionising Radiation (Atomic Act) and on Amendement and Alteration of Some Acts, in the wording of subsequent regulations.

2. In Section 39 in the end of para 1 following words shall be add: "or it shall be laid down in special legal regulation[33a]."

PART IV

ALTERATION TO THE ACT ON METROLOGY

Article V

Act No. 505/1990 Coll. on Metrology as amended by Act No. 119/2000 Coll. shall be altered as follows:

"1. After Section 14 new Section 14 a), including the title and the notice under line No 2a), shall be added worded as follows:

Section 14 a

State Office for Nuclear Safety

The State Office for Nuclear Safety, within the framework of performance of the state supervision over radiation protection and emergency preparedness, shall check whether the users of meters, who are the holders of licence pursuant to special legal regulation[2a], meet their obligations established by this Act for meters designed or used for measuring of ionising radiation and radioactive substances.

[2a] Act No. 18/1997 Coll. on peaceful utilisation of nuclear energy and ionising radiation (the Atomic Act) and on amendment and alteration of some acts, in wording of subsequent regulations

Present notices under line No 2a) and 2b) shall become notices under line No 2b) and 2c) including references to them.

2. In Section 23 after the paragraph 1 a new paragraph 2 shall be added, worded as follows:

"(2) State Office for Nuclear Safety acting in accordance with this Act may impose a penalty up to CZK 1 million on a user of meter who is a licensee under the special legal Act[2a] and who

a) has, without a valid verification, used a specified meter for the purpose for which the meter was declared as specified;

b) shall not meet obligations laid down in Section 18 a).".

Present paragraphs 2 to 5 shall be renumbered paragraphs 3 to 6.

PART V

AMENDMENT TO THE ACT ON THE ESTABLISHMENT OF MINISTRIES AND OTHER BODIES OF THE STATE ADMINISTRATION OF THE CZECH REPUBLIC

Article VI

In Section 16 of Act No. 2/1969 Coll. on the Establishment of Ministries and other Bodies of the State Administration of the Czech Republic as amended by Acts No. 60/1988 Coll., No. 173/1989 Coll., No. 288/1990 Coll., No. 548/1992 Coll., No. 21/1993 Coll., No. 285/1993 Coll., No. 289/1995 Coll. and Act No. 239/2000 Coll. after para 3 a new para 4 shall be added, worded as follows:

"(4) The Ministry of Defence shall perform the state supervision over radiation protection within military premises. ".

Present paragraph 4 shall become respectively paragraph 5.

PART VI

EFFICIENCY

Article VII

This Act shall apply from 1 July 2002 with the exception of Article I item 33, item 68, as for Article 47 para 11, Article II and Article III which shall apply from the first day of the moth following the day of the publication of this Act, and with the exception of Article I item 19, as for Section 9 para 1p), item 37, as for Section 18 para 1p) and item 51 which shall apply from the day of the Treaty on the Czech Republic accession to the European Union shall enter into force.

ČEZ Group – Consolidated Balance Sheets in Accordance with IFRS

Consolidated Balance Sheets as at 31 December (in CZK millions)

	2004	2003
Assets		
Property, plant and equipment:		
Plant in service	374,731	366,594
Less accumulated provision for depreciation	165,878	149,776
Net plant in service (Note 3)	208,853	216,818
Nuclear fuel, at amortized cost	7,956	9,574
Construction work in progress	10,626	10,204
Total property, plant and equipment	227,435	236,596
Other non-current assets:		
Investment in associates	7,474	10,999
Investments and other financial assets, net (Note 4)	19,690	8,642
Intangible assets, net (Note 5)	3,294	1,997
Deferred tax assets (Note 21)	189	288
Total other non-current assets	30,647	21,926
Total non-current assets	258,082	258,522
Current assets:		
Cash and cash equivalents (Note 8)	7,545	4,014
Receivables, net (Note 9)	8,904	7,064
Income tax receivable	26	103
Materials and supplies, net	3,184	3,242
Fossil fuel stocks	739	979
Other current assets (Note 10)	2,335	4,299
Total current assets	22,733	19,701
Total assets	280,815	278,223
Shareholders' equity and liabilities		
Shareholders' equity:		
Stated capital	59,218	59,152
Retained earnings and other reserves	104,471	93,472
Total shareholders' equity (Note 11)	163,689	152,624
Minority interest	5,282	7,893
Long-term liabilities:		
Long-term debt, net of current portion (Note 12)	38,190	30,965
Accumulated provision for nuclear decommissioning and fuel storage (Note 14)	29,441	28,164
Other long-term liabilities	5,192	5,206
Total long-term liabilities	72,823	64,335
Deferred tax liability (Note 21)	16,008	15,863
Current liabilities:		
Short-term loans (Note 15)	240	2,320
Current portion of long-term debt (Note 12)	3,439	5,691
Trade and other payables (Note 17)	12,409	20,579
Income taxes payable	1,021	3,203
Accrued liabilities (Note 18)	5,904	5,715
Total current liabilities	23,013	37,508
Total shareholders' equity and liabilities	280,815	278,223

The accompanying notes are an integral part of these consolidated financial statements.

ČEZ Group – Consolidated Income Statements in Accordance with IFRS

Consolidated Income Statements for the Years Ended December 31 (in CZK millions)

	2004	2003	2002
Revenues:			
Sales of electricity (Note 19)	92,748	79,548	52,938
Heat sales and other revenues	7,417	5,268	2,640
Total revenues	100,165	84,816	55,578
Operating expenses:			
Fuel	14,370	14,307	12,894
Purchased power and related services	26,511	21,100	7,328
Repairs and maintenance	4,420	4,226	3,847
Depreciation and amortization	18,384	16,961	11,721
Salaries and wages	9,644	7,994	3,854
Materials and supplies	3,769	3,670	1,838
Other operating expenses (Note 20)	3,912	3,554	2,873
Total expenses	81,010	71,812	44,355
Income before other expenses (income) and income taxes	19,155	13,004	11,223
Other expenses (income):			
Interest on debt, net of capitalized interest (Note 2.9)	1,864	1,714	582
Interest on nuclear provisions (Note 2.23 and 14)	1,965	1,680	1,532
Interest income	(329)	(319)	(149)
Foreign exchange rate losses (gains), net	(1,766)	(1,915)	(3,340)
Other expenses (income), net (Note 22)	227	2,170	1,299
Income from associates (Note 2.3)	(734)	(1,063)	(497)
Total other expenses (income)	1,227	2,267	(573)
Income before income taxes	17,928	10,737	11,796
Income taxes (Note 21)	3,845	1,349	3,375
Income after income taxes	14,083	9,388	8,421
Minority interest	1,024	519	–
Net income	13,059	8,869	8,421
Net income per share (CZK per share) (Note 26)			
Basic	22.1	15.0	14.3
Diluted	22.1	15.0	14.2
Average number of shares outstanding (000s) (Notes 11 and 26)			
Basic	592,075	590,772	590,363
Diluted	592,211	592,211	592,150

The accompanying notes are an integral part of these consolidated financial statements.

ČEZ Group – Consolidated Statements of Shareholders' Equity in Accordance with IFRS

Consolidated Statements of Shareholders' Equity for the Years Ended December 31 (in CZK millions)

	Number of Shares (in thousand)	Stated Capital	Translation Difference	Fair value and Other Reserves	Retained Earnings	Total Equity
December 31, 2001	590,138	59,050	–	–	77,676	136,726
Additional paid-in capital	123	12	–	–	–	12
Net income	–	–	–	–	8,421	8,421
Acquisition of treasury shares	(1,950)	(181)	–	–	–	(181)
Sale of treasury shares	1,965	160	–	–	17	177
Dividends declared	–	–	–	–	(1,480)	(1,480)
December 31, 2002 as previously reported	590,276	59,041	–	–	84,634	143,675
Change in accounting policy – effect of change in group structure (Note 2.4)	–	–	–	–	609	609
January 1, 2003, as restated	590,276	59,041	–	–	85,243	144,284
Net income	–	–	–	–	8,869	8,869
Change in fair value of available-for-sale financial assets recognized in equity	–	–	–	(101)	–	(101)
Gain on sale of subsidiary ČEPS, a.s., net of tax (Note 25)	–	–	–	–	7,162	7,162
Effect of acquisition of REAS on equity (Note 6)	–	–	–	–	(5,023)	(5,023)
Sale of treasury shares	1,190	111	–	–	(5)	106
Dividends declared	–	–	–	–	(2,657)	(2,657)
Returned dividends on treasury shares	–	–	–	–	4	4
Share options	–	–	–	21	–	21
Share on equity movements of associates	–	–	–	–	(25)	(25)
Other movements	–	–	1	(1)	(16)	(16)
December 31, 2003	591,466	59,152	1	(81)	93,552	152,624
Net income	–	–	–	–	13,059	13,059
Change in fair value of available-for-sale financial assets recognized in equity	–	–	–	55	–	55
Change in fair value of cash flow hedges recognized in equity	–	–	–	(690)	–	(690)
Cash flow hedges removed from equity	–	–	–	621	–	621
Gain on sale of subsidiary ČEPS, a.s., net of tax (Note 25)	–	–	–	–	2,436	2,436
Effect of acquisition of ŠKODA PRAHA a.s. on equity (Note 6)	–	–	–	–	331	331
Acquisition of treasury shares	(2,355)	(488)	–	–	–	(488)
Sale of treasury shares	3,090	554	–	–	(223)	331
Dividends declared	–	–	–	–	(4,738)	(4,738)
Share options	–	–	–	130	–	130
Share on equity movements of associates	–	–	–	–	34	34
Other movements	–	–	(3)	–	(13)	(16)
December 31, 2004	592,201	59,218	(2)	35	104,438	163,689

The accompanying notes are an integral part of these consolidated financial statements.

ČEZ Group – Consolidated Statements of Cash Flows in Accordance with IFRS

Consolidated Statements of Cash Flows for the Years Ended December 31 (in CZK millions)

	2004	2003	2002
Operating activities:			
Income before income taxes	17,928	10,737	11,796
Adjustments to reconcile income before income taxes to net cash provided by operating activities:			
Depreciation, amortization and asset write-offs	18,522	16,969	11,735
Amortization of nuclear fuel	3,391	3,484	2,071
(Gain) loss on fixed asset retirements, net	(1,137)	(384)	(363)
Foreign exchange rate loss (gain), net	(1,766)	(1,915)	(3,340)
Interest expense, interest income and dividend income, net	1,308	1,054	356
Provision for nuclear decommissioning and fuel storage	538	228	641
Provisions for doubtful accounts, environmental claims and other adjustments	(1,251)	1,602	(53)
Income from associates	(734)	(1,063)	(497)
Changes in assets and liabilities:			
Receivables	2,387	1,137	(282)
Materials and supplies	285	(152)	44
Fossil fuel stocks	240	(343)	39
Other current assets	1,997	1,903	334
Trade and other payables	(1,836)	2,142	353
Accrued liabilities	521	1,103	(363)
Cash generated from operations	40,393	36,502	22,471
Income taxes paid	(6,425)	(44)	(3,395)
Interest paid, net of capitalized interest	(1,478)	(1,601)	(434)
Interest received	327	316	149
Dividends received	1,322	587	210
Net cash provided by operating activities	34,139	35,760	19,001
Investing activities:			
Acquisition of subsidiaries, net of cash acquired (Note 6)	(18,166)	(28,374)	–
Proceeds from disposal of a subsidiary, net of cash disposed of	–	12,208	–
Additions to property, plant and equipment and other non-current assets, including capitalized interest (Note 2.9)	(15,783)	(23,942)	(10,419)
Proceeds from sales of fixed assets	4,760	9,585	1,078
Change in decommissioning and other restricted funds	(443)	(407)	(594)
Total cash used in investing activities	(29,632)	(30,930)	(9,935)
Financing activities:			
Proceeds from borrowings	15,004	31,284	8,446
Payments of borrowings	(10,419)	(33,736)	(13,864)
Proceeds from other long-term liabilities	96	131	–
Payments of other long-term liabilities	(373)	(66)	–
Dividends paid to Company's shareholders	(4,724)	(2,640)	(1,480)
Dividends paid to minority interests	(117)	(227)	–
Acquisition/sale of treasury shares	(156)	106	(4)
Total cash used in financing activities	(689)	(5,148)	(6,902)
Net effect of currency translation in cash	(287)	(59)	(219)
Net increase (decrease) in cash and cash equivalents	3,531	(377)	1,945
Cash and cash equivalents at beginning of period	4,014	4,225	2,280
Effect of change in group structure on opening balance of cash and cash equivalents	–	166	–
Cash and cash equivalents at beginning of period, as restated	4,014	4,391	2,280
Cash and cash equivalents at end of period	7,545	4,014	4,225
Supplementary cash flow information			
Total cash paid for interest	2,029	2,538	2,562

The accompanying notes are an integral part of these consolidated financial statements.

1. The Company

ČEZ, a. s. ("ČEZ" or "the Company") is a Czech Republic joint-stock company, owned 67.6% at December 31, 2004 by the Czech Republic National Property Fund. The remaining shares of the Company are publicly held. The address of the Company's registered office is Duhová 2/1444, Praha 4, 140 53, Czech Republic. The average number of employees of the Company and its consolidated subsidiaries was 16,702, 16,093 and 7,806 for the year 2004, 2003 and 2002, respectively.

ČEZ is an electricity generation company, which produced approximately 73% of the electricity and a portion of the district heating in the Czech Republic in 2004. The Company sells majority of its electricity production to eight distribution companies ("REAS") in the Czech Republic which distribute the electricity to end customers (see Note 19). The Company operates ten fossil fuel plants, thirteen hydroelectric plants and two nuclear plants.

The company is a parent company of the ČEZ Group ("the Group"), which is primarily engaged in the business of production, distribution and sale of electricity (see Notes 2.3 and 7).

In December 2004 Czech Parliament revised The Act on Conditions of Business Activity and State Administration in the Energy Industries (the "Energy Law"). The Energy Law provides the conditions for business activities, performance of public administration and regulation in the energy sectors, including electricity, gas and heat, as well as the rights of and obligations of individuals and legal entities related thereto. The business activities in the energy sectors in the Czech Republic may only be pursued by individuals or legal entities upon the basis of government authorization in the form of licenses granted by the Energy Regulatory Office.

Responsibility for public administration in the energy sectors is exercised by the Ministry of Industry and Trade (the "Ministry"), the Energy Regulatory Office and the State Energy Inspection Board.

The Ministry, as the central public administration body for the energy sector, issues state approval to construct new energy facilities in accordance with specified conditions, develops the energy policy of the state and ensures fulfillment of obligations resulting from international treaties binding on the Czech Republic or obligations resulting from membership in international organizations.

The Energy Regulatory Office was established as the administrative office to exercise regulation in the energy sector of the Czech Republic, to support economic competition and to protect consumers' interests in sectors where competition is not possible. The Energy Regulatory Office decides on the granting of a license, imposition of the supply obligation beyond the scope of the license, imposition of the obligation to let another license holder use energy facilities in cases of emergency, to exercise the supply obligation beyond the scope of the license and price regulation based on special legal regulations. The State Energy Inspection Board is the inspection body supervising the activities in the energy sector.

Third-party access is being introduced gradually between 2002 and, at the latest, 2006 at which time all electricity customers will be able to purchase electricity from any distributor, eligible generator, or trader.

On March 11, 2002 the Government decided to sell shares in the eight REAS, which are held by the National Property Fund and Czech Consolidation Agency, to ČEZ and to purchase from ČEZ a 66% share in its transmission subsidiary ČEPS, a.s. ("ČEPS"). The transaction was carried out on April 1, 2003 (see Notes 2.3, 6 and 25).

Through this transaction ČEZ has acquired a majority share in five REAS, and a minority share in three REAS. However, the Economic Competition Protection Authority has ruled that ČEZ had to sell its shares in one of the REAS in which it acquired a majority share and in three of the REAS in which it acquired a minority share. The Economic Competition Protection Authority has also decided that ČEZ should sell its remaining equity share in ČEPS. Following the decisions of the Economic Competition Protection Authority, ČEZ has sold in September 2003 its shares in two of the three REAS (Jihočeská energetika, a.s., a Jihomoravská energetika, a.s.), where ČEZ previously acquired minority shares. The shares in Pražská energetika, a.s., and ČEPS, a.s., have been sold during 2004. In March 2005 the Economic Competition Protection Authority canceled its previous decision, which required ČEZ to sell its majority share in one of the acquired REAS. This new decision is conditioned by an obligation of ČEZ to allow access to its electricity production capacity of total 400 MW for independent subjects in the period 2006 and 2007. The price for the offered production capacity will be result of an auction.

2. Summary of Significant Accounting Policies

2.1. Basis of Accounting

The Company is required to maintain its books and records in accordance with accounting principles and practices mandated by the Czech Law on Accounting. The accompanying consolidated financial statements reflect certain adjustments and reclassifications not recorded in the accounting records of the Company in order to conform the Czech statutory balances to financial statements prepared in accordance with International Financial Reporting Standards issued by the International Accounting Standards Board. The adjustments are summarized in Note 29.

2.2. Financial Statements

The accompanying consolidated financial statements of ČEZ are prepared in accordance with International Financial Reporting Standards (IFRS). They are prepared under the historical cost convention, except when IFRS requires other measurement basis as disclosed in the accounting policies below.

2.3. Group Accounting

a. Group Structure

The financial statements include the accounts of ČEZ, a. s., its subsidiaries and associates, which are shown in the Note 7. Other investments are excluded from the consolidation because the impact on the consolidated financial statements would not be material. These investments are included in the balance sheet under investments and other financial assets and are stated at cost net of provision for diminution in value (see Note 4).

b. Subsidiaries

Subsidiaries, which are those entities in which the Group has an interest of more than one half of the voting rights or otherwise has power to govern the financial and operating policies, are consolidated.

Subsidiaries are consolidated from the date on which control is transferred to the Group and are no longer consolidated from the date that control ceases.

The purchase method of accounting is used to account for the acquisition of subsidiaries from unrelated parties. The cost of an acquisition is measured as the fair value of the assets given up, shares issued or liabilities undertaken at the date of acquisition plus costs directly attributable to the acquisition. The excess of the cost of acquisition over the fair value of the net assets of the subsidiary acquired is recorded as goodwill. In case of subsequent acquisition of a minority interest in subsidiary, which has been already controlled by the Group, the goodwill is measured as the difference between the cost of the additionally acquired shares and the book value of the minority interest acquired.

In case of acquisitions of subsidiaries from entities under common control the assets and liabilities of the acquired subsidiaries are initially included in the consolidated financial statements at their book values at the date of acquisition. The difference between the cost of acquisition and the share of the book value of net assets of the subsidiary acquired is recorded directly in equity.

Intercompany transactions, balances and unrealized gains on transactions between group companies are eliminated; unrealized losses are also eliminated unless cost cannot be recovered. Where necessary, accounting policies of subsidiaries have been changed to ensure consistency with the policies adopted by the Group.

c. Associates

Investments in associates are accounted for by the equity method of accounting. Under this method the company’s share of the post-acquisition profits or losses of associates is recognized in the income statement and its share of other post-acquisition movements in equity of associates is recognized directly in equity. The cumulative post-acquisition movements are adjusted against the cost of the investment. Associates are entities over which the Group generally has between 20% and 50% of the voting rights, or over which the Group has significant influence, but which it does not control. Unrealized gains on transactions between the Group and its associates are eliminated to the extent of the company’s interest in the associates; unrealized losses are also eliminated unless the transaction provides evidence of an impairment of the asset transferred. The Group’s investment in associates includes goodwill (net of accumulated impairment losses) on acquisition. When the Group’s share of losses in an associate equals or exceeds its interest in the associate, the Group does not recognize further losses, unless the Group has incurred obligations or made payments on behalf of the associates.

2.4. Change in Accounting Principles

a. Adoption of IFRIC 1

In 2004 the Company adopted IFRIC Interpretation 1, Changes in Existing Decommissioning, Restoration and Similar Liabilities ("IFRIC 1"). Following the interpretation, changes in the measurement of an existing decommissioning, restoration and similar liability that result from changes in the estimated timing or amount of the outflow of resources embodying economic benefits required to settle the obligation, or a change in the discount rate are added to, or deducted from, the cost of the related asset in the current period (see Notes 2.23 and 14).

Prior to application of IFRIC 1 in 2004 the Group followed a different accounting policy, under which the changes in a decommissioning liability that resulted from a change in the current best estimate of cash flows required to settle the obligation or a change in the discount rate were added to (or deducted from) the amount recognized as the related asset to the extent the change related to future periods. To the extent the change related to the current or prior periods, it was reported as income or expense for the current period.

IFRIC 1 has been applied retrospectively and the prior year comparative information has been restated. The effect of the retrospective adoption of IFRIC 1 has been to increase consolidated net income for the year 2003 by CZK 2,937 million with the corresponding increase in capitalized costs of nuclear provisions and the deferred tax liability. Adoption of IFRIC 1 had no effect on the presented income statement for the year 2002.

b. Change in group structure

In 2003 the Company included in the consolidated group certain companies, which previously have not been consolidated, because the impact on the consolidated financial statements was not significant. In previous periods the investments in these companies have been included in other financial assets as available for sale financial investments. The impact of consolidation of the previously unconsolidated subsidiaries and associates was recorded in 2003 directly in equity by adjusting the opening balance of retained earnings (see Note 7). Comparative information has not been restated, because it was impracticable to do so.

c. Comparatives

Certain prior year financial statement items have been reclassified to conform to the current year presentation.

d. New IFRS standards

The International Accounting Standards Board (IASB) introduced many changes to the International Financial Reporting Standards and issued new standards and interpretations during 2003 and 2004 that will be valid from January 1, 2005, or later. Therefore, it is possible that the IFRS financial statements for the year ended December 31, 2005, or later will contain comparative data for the year 2004 that will differ from the data presented in these financial statements. The Company is currently assessing the impact that new or revised standards will have on the Group accounting policies and financial data presented.

2.5. Measurement Currency

Based on the economic substance of the underlying events and circumstances relevant to the Group, the measurement currency of the Group has been determined to be the Czech crown (CZK).

2.6. Estimates

The preparation of financial statements in conformity with International Financial Reporting Standards requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

2.7. Revenues

The Group recognizes revenue from supplies of electricity and related services based on contract terms. Differences between contracted amounts and actual supplies are settled through the market operator.

2.8. Fuel Costs

Fuel costs are expensed as fuel is consumed. Fuel expense includes the amortization of the cost of nuclear fuel. Amortization of nuclear fuel charged to fuel expense was CZK 3,391 million, CZK 3,484 million and CZK 2,071 million for the years ended December 31, 2004, 2003 and 2002, respectively. The amortization of nuclear fuel includes charges in respect of additions to the accumulated provision for interim storage of spent nuclear fuel to the extent they relate to the nuclear fuel consumed during the current accounting period (see Note 14). Such charges amounted to CZK 203 million, CZK 113 million and CZK 82 million in 2004, 2003 and 2002, respectively.

2.9. Interest

The Group capitalizes all interest incurred in connection with its construction program that theoretically could have been avoided if expenditures for the assets had not been made. Such capitalized interest costs amounted to CZK 552 million, CZK 937 million and CZK 2,128 million, which was equivalent to an interest capitalization rate of 6.5%, 7.4% and 7.5% in 2004, 2003 and 2002, respectively.

2.10. Property, Plant and Equipment

Property, plant and equipment are recorded at cost net of accumulated depreciation and valuation allowances. Cost of plant in service includes materials, labor, payroll-related costs and the cost of debt financing used during construction. The cost also includes the estimated cost of dismantling and removing the asset and restoring the site, to the extent that it is recognized as a provision under IAS 37, Provisions, Contingent Liabilities and Contingent Assets. Government grants received for construction of certain environmental installations decrease the acquisition cost of the respective items of property, plant and equipment.

The cost of maintenance, repairs, and replacement of minor items of property is charged to maintenance expense when incurred. Renewals and improvements are capitalized. Upon sale or retirement of property, plant and equipment, the cost and related accumulated depreciation are eliminated from the accounts. Any resulting gains or losses are included in the determination of net income.

At each reporting date, the Group assesses whether there is any indication that an asset may be impaired. Where an indicator of impairment exists, the Group reviews the recoverable amounts of its property, plant and equipment to determine whether such amounts continue to exceed the assets' carrying values.

Depreciation

The Group depreciates the original cost of property, plant and equipment by using the straight-line method over the estimated economic lives. The depreciable lives used for property, plant and equipment are as follows:

	Lives
Buildings and structures	25 – 50
Machinery and equipment	4 – 25
Vehicles	4 – 20
Furniture and fixtures	8 – 15

Average depreciable lives based on the functional use of property are as follows:

	Average Life
Hydro plants	
Buildings and structures	44
Machinery and equipment	16
Fossil fuel plants	
Buildings and structures	32
Machinery and equipment	14
Nuclear power plant	
Buildings and structures	32
Machinery and equipment	17
Electricity distribution grid	30

Depreciation of plant in service was CZK 17,648 million, CZK 16,319 million and CZK 11,375 million for the years ended December 31, 2004, 2003 and 2002, which was equivalent to a composite depreciation rate of 4.7%, 5.3% and 5.6%, respectively.

2.11. Nuclear Fuel

Nuclear fuel is stated at original cost, net of accumulated amortization. Amortization of fuel in the reactor is based on the amount of power generated.

Nuclear fuel includes capitalized costs of related provisions (see Note 2.23). At December 31, 2004 and 2003 capitalized costs at net book value amounted to CZK 233 million and CZK 360 million, respectively.

2.12. Intangible Assets, Net

Intangible assets are valued at their acquisition costs and related expenses. Intangible assets are amortized over their useful life using the straight-line method. The estimated useful life of intangible assets ranges from 4 to 15 years.

2.13. Goodwill

Goodwill represents the excess of the cost of an acquisition over the Group's share of the net identifiable assets of the acquired subsidiary/associate at the date of acquisition (see Note 2.3). Goodwill on acquisitions of subsidiaries is included in intangible assets. Goodwill on acquisitions of associates is included in investments in associates. Following initial recognition, goodwill is measured at cost less any accumulated impairment losses. Goodwill is reviewed for impairment, annually or more frequently if events or changes in circumstances indicate that the carrying value may be impaired.

As at the acquisition date, any goodwill acquired is allocated to each of the cash-generating units expected to benefit from the combination's synergies. Impairment is determined by assessing the recoverable amount of the cash-generating unit, to which the goodwill relates. Where recoverable amount of the cash-generating unit is less than the carrying amount, an impairment loss is recognized. Where goodwill forms part of a cash-generating unit and part of the operation within that unit are disposed of, the goodwill associated with the operation disposed of is included in the carrying amount of the operation when determining the gain or loss on disposal of the operation. Goodwill disposed of in this circumstance is measured on the basis of the relative values of the operation disposed of and the portion of the cash-generating unit retained.

2.14. Investments

Investments are classified into the following categories: held-to-maturity, trading and available-for-sale. Investments with fixed or determinable payments and fixed maturity that the Company has the positive intent and ability to hold to maturity other than loans and receivables originated by the Company are classified as held-to-maturity investments. Investments acquired principally for the purpose of generating a profit from short-term fluctuations in price are classified as trading. All other investments, other than loans and receivables originated by the company, are classified as available-for-sale.

Held-to-maturity investments are included in non-current assets unless they mature within 12 months of the balance sheet date. Investments held for trading are included in current assets. Available-for-sale investments are classified as current assets if management intends to realize them within 12 months of the balance sheet date.

All purchases and sales of investments are recognized on the settlement date.

Investments are initially measured at cost, which is the fair value of the consideration given for them, including transaction costs.

Available-for-sale and trading investments are subsequently carried at fair value without any deduction for transaction costs by reference to their quoted market price at the balance sheet date. Equity securities classified as available-for-sale and trading investments that do not have a quoted market price in an active market are measured at cost. The carrying amounts of such investments are reviewed at each balance sheet date for impairment.

Gains or losses on measurement to fair value of available-for-sale investments are recognized directly in the fair value reserve in shareholders equity, until the investment is sold or otherwise disposed of, or until it is determined to be impaired, at which time the cumulative gain or loss previously recognized in equity is included in net profit or loss for the period.

Changes in the fair values of trading investments are included in other expense (income).

Held-to-maturity investments are carried at amortized cost using the effective interest rate method.

2.15. Cash and Cash Equivalents

Cash and cash equivalents include cash on hand, current accounts with banks and short-term bank notes with a maturity of three months or less (see Note 8). Foreign currency deposits are translated at December 31, 2004 and 2003 exchange rates, respectively.

2.16. Cash Restricted in Its Use

Restricted balances of cash shown under other non-current financial assets as restricted funds (see Note 4) relate to deposits for waste storage reclamation, funding of nuclear decommissioning liabilities and cash guarantees given to swap transaction partners. The non-current classification is based on the expected timing of the release of the funds to the Group.

2.17. Receivables, Payables and Accruals

Receivables are recognized and carried at original invoice amount less an allowance for any uncollectible amounts. At December 31, 2004 and 2003 the allowance for uncollectible receivables amounted to CZK 1,653 million and CZK 2,317 million, respectively.

Payables are recorded at invoiced values and accruals are reported at expected settlement values.

2.18. Materials and Supplies

Materials and supplies are principally composed of maintenance materials and spare parts for repairs and maintenance of tangible assets. Cost is determined by using weighted average cost, which approximates actual cost. These materials are recorded in inventory when purchased and then expensed or capitalized to plant, as appropriate, when used. The Group records a provision for obsolete inventory as such items are identified.

2.19. Fossil Fuel Stocks

Fossil fuel stocks are stated at weighted average cost, which approximates actual cost.

2.20. Derivative Financial Instruments

The Group uses derivative financial instruments such as foreign currency contracts and interest rate swaps to hedge its risks associated with interest rate and foreign currency fluctuations. Such derivative financial instruments are stated at fair value. The method of recognizing the resulting gain or loss depends on whether the derivative is designated as a hedging instrument, and if so, the nature of the item being hedged.

For the purpose of hedge accounting, hedges are classified as either fair value hedges when they hedge the exposure to changes in the fair value of a recognized asset or liability; or cash flow hedges where they hedge exposure to variability in cash flows that is either attributable to a particular risk associated with a recognized asset or liability or a forecasted transaction.

The Group documents at the inception of the transaction the relationship between hedging instruments and hedged items, as well as its risk management objective and strategy for undertaking various hedge transactions. The Group also documents its assessment, both at hedge inception and on an ongoing basis, of whether the derivatives that are used in hedging transactions are highly effective in offsetting changes in fair values or cash flows of hedged items.

a. Fair value hedge

Gain or loss from remeasuring the hedging instrument at fair value is recognized immediately in the income statement. Any gain or loss on the hedged item attributable to the hedged risk is adjusted against the carrying amount of the hedged item and recognized in the income statement. Where the adjustment is to the carrying amount of a hedged interest-bearing financial instrument, the adjustment is amortized to the net profit and loss such that it is fully amortized by maturity.

b. Cash flow hedge

The effective portion of changes in the fair value of derivatives that are designated and qualify as cash flow hedges are recognized in equity. The gain or loss relating to the ineffective portion is recognized in the income statement.

Amounts accumulated in equity are recycled in the income statement in the periods when the hedged item will affect profit or loss.

When a hedging instrument expires or is sold, or when a hedge no longer meets the criteria for hedge accounting, any cumulative gain or loss existing in equity at that time remains in equity and is recorded to the income statement when the forecast transaction is ultimately recognized. When a forecasted transaction is no longer expected to occur, the cumulative gain or loss that was reported in equity is immediately transferred to the income statement.

c. Derivatives that do not qualify for hedge accounting

Certain derivative instruments do not qualify for hedge accounting. Changes in the fair value of any derivative instruments that do not qualify for hedge accounting are recognized immediately in the income statement.

2.21. Income Taxes

The provision for corporate tax is calculated in accordance with Czech tax regulations and is based on the income or loss reported under Czech accounting regulations, adjusted for appropriate permanent and temporary differences from Czech taxable income. In the Czech Republic, income taxes are calculated on an individual company basis as the tax laws do not permit consolidated tax returns. Current income taxes are provided at a rate of 28%, 31% and 31% for the year ended December 31, 2004, 2003 and 2002, respectively, after adjustments for certain items which are not deductible, or taxable, for taxation purposes.

Deferred income tax is provided, using the liability method, on all temporary differences at the balance sheet date between the tax bases of assets and liabilities and their carrying amounts for financial reporting purposes. Deferred income tax is determined using tax rates (and laws) that have been enacted by the balance sheet date and are expected to apply when the related deferred income tax asset is realized or the deferred income tax liability is settled.

Deferred tax assets and liabilities are recognized regardless of when the temporary difference is likely to reverse. Deferred tax assets and liabilities are not discounted. Deferred tax assets are recognized when it is probable that sufficient taxable profits will be available against which the deferred tax assets can be utilized. A deferred tax liability is recognized for all taxable temporary differences, except goodwill for which amortization is not deductible for tax purposes. Deferred tax assets and liabilities of group companies are not offset in the balance sheet.

Current tax and deferred tax are charged or credited directly to equity if the tax relates to items that are credited or charged, in the same or a different period, directly to equity.

2.22. Long-term Debt

Borrowings are initially recognized at the amount of the proceeds received, net of transaction costs. They are subsequently carried at amortized cost using the effective interest rate method, the difference between net proceeds and redemption value is being recognized in the net income over the life of the borrowings as interest expense.

Transaction costs include fees and commissions paid to agents, advisers, brokers and dealers, levies by regulatory agencies and securities exchanges.

2.23. Nuclear Provisions

Group has recognized provisions for its obligations to decommission its nuclear power plants at the end of their operating lives, to store the related spent nuclear fuel initially on an interim basis and provision for its obligation to provide financing for subsequent permanent storage of spent fuel and irradiated parts of reactors.

The provisions recognized represent the best estimate of the expenditures required to settle the present obligation at the current balance sheet date. Such cost estimates, expressed at current price levels at the date of the estimate, are discounted using a long-term real rate of interest of 2.5% per annum to take into account the timing of payments. The initial discounted cost amounts are capitalized as part of property, plant and equipment and are depreciated over the lives of the nuclear plants. Each year, the provisions are increased to reflect the accretion of discount and to accrue an estimate for the effects of inflation, with the charges being recognized as a component of interest expense. The estimate for the effect of inflation is approximately 4.5%, which is based on the current rate of interest on long-term Czech government bonds of approximately 7% and the estimated 2.5% real rate of interest.

The decommissioning process is expected to continue for approximately a sixty-year period subsequent to the final operation of the plants. Furthermore, spent nuclear fuel will be stored on a temporary basis until approximately 2065 when permanent storage facilities are planned to become available. While the Group has made its best estimate in establishing its nuclear provisions, because of potential changes in technology as well as safety and environmental requirements, plus the actual time scale to complete decommissioning and fuel storage activities, the ultimate provision requirements could either increase or decrease significantly from the Group's current estimates.

Since 2004, pursuant to IFRIC 1 (see Note 2.4), changes in a decommissioning liability that result from a change in the current best estimate of cash flows required to settle the obligation or a change in the discount rate are added to (or deducted from) the amount recognized as the related asset. However, to the extent that such a treatment would result in a negative asset, the effect of the change is recognized in the income for the current period. If the adjustment results in an addition to the cost of an asset, the Company performs an impairment review to confirm, whether the value of the asset is fully recoverable.

2.24. Leases

a. A Group company is a lessee

Finance leases, which transfer to the Group substantially all the risks and benefits incidental to ownership of the leased item, are capitalized at the inception of the lease at the fair value of the leased property or, if lower, at the present value of the minimum lease payments. Lease payments are apportioned between the finance charges and reduction of the lease liability so as to achieve a constant rate of interest on the remaining balance of the liability. Finance charges are charged directly against income.
Capitalized leased assets are depreciated over the estimated useful life of the asset. If there is no reasonable certainty that the lessee will obtain ownership by the end of the lease term, the asset is fully depreciated over the shorter of the lease term or its useful life.
Leases where the lessor retains substantially all the risks and benefits of ownership of the asset are classified as operating leases. Operating lease payments are recognized as an expense in the income statement on a straight-line basis over the lease term.

b. A Group company is the lessor

When assets are leased out under a finance lease, the present value of the lease payments is recognized as a receivable. The difference between the gross receivable and the present value of the receivable is recognized over the lease term as finance income. Lease income is recognized over the term of the lease using the net investment method, which reflects a constant periodic rate of return.
Assets leased out under operating leases are included in property, plant and equipment in the balance sheet. They are depreciated over their expected useful lives on a basis consistent with similar owned property, plant and equipment. Rental income (net of any incentives given to lessees) is recognized on a straight-line basis over the lease term.

2.25. Treasury Shares

Treasury shares are presented in the balance sheet as a deduction from equity. The acquisition of treasury shares is presented in the statement of equity as a reduction to equity. No gain or loss is recognized in the income statement on the sale, issuance, or cancellation of treasury shares. Consideration received is presented in the financial statements as an addition to equity.

2.26. Share Options

Board of directors, certain members of management of the Company and the Supervisory Board members have been granted options to purchase common shares of the Company. Employee compensation expense is measured on the date of the grant to the extent the quoted market price of the shares exceeds the exercise price of the share options.

2.27. Translation of Foreign Currencies

Foreign currency transactions are translated into the measurement currency using the exchange rates prevailing at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation of monetary assets and liabilities denominated in foreign currencies are recognized in the income statement, except when deferred in equity as qualifying cash flow hedges.
Translation differences on debt securities and other monetary financial assets measured at fair value are included in foreign exchange gains and losses. Translation differences on non-monetary items such as equities held for trading are reported as part of the fair value gain or loss. Translation differences on available-for-sale equities are included in the revaluation reserve in equity.
The assets and liabilities of foreign subsidiaries are translated at the rate of exchange ruling at the balance sheet date. The income statements of foreign subsidiaries are translated at weighted average exchange rates for the year. The exchange differences arising on the retranslation are taken directly to equity. On disposal of a foreign entity, accumulated exchange differences are recognized in the income statement as a component of the gain or loss on disposal.
Goodwill and fair value adjustments arising on the acquisition of a foreign entity are treated as assets and liabilities of the acquiring company and are recorded at the exchange rate at the date of the transaction.
The Group has used the following exchange rates for the translation of monetary items at December 31, 2004 and 2003:

	2004	2003
CZK per EUR	30.465	32.405
CZK per USD	22.365	25.654

3. Net Plant in Service

Net plant in service at December 31, 2004 and 2003 is as follows (in CZK millions):

	Buildings	Plant and Equipment	Land and Other	Total 2004	Total 2003
Cost – opening balance	130,406	234,623	1,565	366,594	242,338
Plant additions	4,354	6,123	15	10,492	58,991
Retirements	(1,073)	(1,812)	(74)	(2,959)	(4,081)
Acquisition of subsidiaries	333	257	14	604	83,963
Disposal of subsidiaries	–	–	–	–	(14,617)
Cost – closing balance	134,020	239,191	1,520	374,731	366,594
Accumulated deprec. and allowances – opening balance	(50,677)	(99,027)	(72)	(149,776)	(103,355)
Depreciation	(4,102)	(13,546)	–	(17,648)	(16,319)
Net book value of assets disposed	(667)	(114)	(1)	(782)	(1,309)
Retirements	1,073	1,812	–	2,885	4,036
Acquisition of subsidiaries	(91)	(244)	–	(335)	(40,821)
Disposal of subsidiaries	–	–	–	–	8,087
Impairment losses recognized	(387)	(29)	(17)	(433)	(224)
Impairment losses reversed	31	153	27	211	129
Accumulated deprec. and allowances – closing balance	(54,820)	(110,995)	(63)	(165,878)	(149,776)
Net plant in service – closing balance	79,200	128,196	1,457	208,853	216,818

At December 31, 2004 and 2003 plant and equipment included the capitalized costs of nuclear provisions as follows (in CZK millions):

	2004	2003
Cost	15,429	14,892
Accumulated depreciation	(3,467)	(3,128)
Total net book value	11,962	11,764

The carrying value of plant and equipment held under finance lease at December 31, 2004 and 2003 is CZK 811 million and CZK 173 million, retrospectively (see Note 16).

None of the Group's plant in service is pledged as security for liabilities.

4. Investments and Other Financial Assets, Net

Investments at December 31, 2004 and 2003 consist of the following (in CZK millions):

	2004	2003
Financial assets in progress, net	8,722	116
Investments in REAS, net	–	3,401
Financial assets available for sale, net	1,992	2,146
Restricted funds for nuclear decommissioning	1,580	1,245
Other restricted funds	1,177	1,069
Long-term receivables, net	6,219	665
Total	19,690	8,642

In 2003 the investments in REAS represent a 34% share in Pražská energetika, a.s., which based on the decision of the Economic Competition Protection Authority was sold in 2004. Financial assets available for sale include also other majority and minority shareholdings in non-consolidated companies (see Note 2.3).

The financial assets in progress represent advances and other consideration paid for shares in subsidiaries and associates, for which the ownership rights have not been transferred to the Company at the year-end. At December 31, 2004, the balance includes mainly the investment in three Bulgarian distribution companies (see Note 28).

At December 31, 2004 and 2003 impairment provisions for financial assets available for sale amounted to CZK 100 million and CZK 281 million, respectively. Impairment provision for investment in REAS (Pražská energetika, a.s.) was CZK 421 million at December 31, 2003 only. At December 31, 2004 and 2003 impairment provisions for financial assets in progress amounted to CZK 77 million and CZK 615 million, respectively.

5. Intangible Assets, Net

Intangible assets at December 31, 2004 and 2003 were as follows (in CZK millions):

	Software	Rights and Other	Goodwill	Total 2004	Total 2003
Cost – opening balance	4,420	244	–	4,664	2,023
Additions	827	258	–	1,085	834
Retirements	(300)	(1)	–	(301)	(70)
Acquisition of subsidiaries	21	1	759	781	2,086
Disposal of subsidiaries	–	–	–	–	(209)
Cost – closing balance	4,968	502	759	6,229	4,664
Accumulated amortization – opening balance	(3,236)	(30)	–	(3,266)	(1,212)
Amortization charge for the year	(712)	(24)	–	(736)	(642)
Net book value of assets disposed	(6)	(59)	–	(65)	(1)
Disposals	300	1	–	301	70
Acquisition of subsidiaries	(20)	(1)	–	(21)	(1,563)
Disposal of subsidiaries	–	–	–	–	82
Accumulated amortization – closing balance	(3,674)	(113)	–	(3,787)	(3,266)
Net intangible assets – closing balance	1,294	389	759	2,442	1,398

At December 31, 2004 and 2003, intangible assets presented on the balance sheet included intangible assets in progress in the amount of CZK 852 million and CZK 599 million, respectively.

At December 31, 2004, the total amount of goodwill was allocated to the distribution segment cash-generating unit (see Note 24) and there have been no accumulated impairment losses.

The recoverable amount of the distribution cash-generating unit has been determined based on a value in use calculation. To calculate this, cash flow projections are based on financial budgets approved by management covering a five-year period. The discount rate applied to cash flow projections is 7% and cash flows beyond the 5-year period are considered at constant level.

6. Acquisition of Subsidiaries and Associates

Acquisitions in 2004

In January 2004 the Company increased its share in ŠKODA PRAHA a.s. from 29.8% to 68.9%. The increase of share capital was repaid by offset of receivables against payables of ŠKODA PRAHA a.s. Through this transaction the Group obtained control over ŠKODA PRAHA a.s. As the shares have been effectively acquired from Czech National Property Fund, an entity under control of ČEZ's ultimate parent (Czech government), ČEZ has accounted for this transaction as an acquisition of subsidiaries under common control (see Note 2.3).

The values of the identifiable assets and liabilities of ŠKODA PRAHA a.s. and other subsidiaries acquired in 2004 are as follows (in CZK millions):

	ŠKODA PRAHA a.s.	Other subsidiaries acquired	Total
Shares acquired in 2004	39.1%		
Property, plant and equipment, net	269	–	269
Deferred income taxes	199	–	199
Other non-current assets	168	–	168
Cash and cash equivalents	249	156	405
Other current assets	1,230	11	1,241
Long-term liabilities	(141)	–	(141)
Deferred income taxes	–	–	–
Current liabilities	(1,363)	(3)	(1,366)
Total net assets	611	164	775
Minority interests	(190)	–	(190)
Share of net assets in associate already recognized using the equity method	(5)	(164)	(169)
Share of net assets acquired	416	–	416
Effect of acquisition of ŠKODA PRAHA a.s. recognized directly in equity	(331)	–	(331)
Goodwill	–	–	–
Total purchase consideration	85	–*)	85
Less:			
Non-monetary contributions	(85)	–	(85)
Cash and cash equivalents in subsidiaries acquired	(249)	(156)	(405)
Cash outflow on acquisition of subsidiaries	(249)	(156)	(405)

*) The amount paid for acquisitions of other subsidiaries in 2004 was less than CZK 1 million.

During 2004 ČEZ purchased further minority shares in 2 of the REAS and other companies from various third parties. The following table summarizes the critical terms of the subsequent acquisitions of minority shares in REAS and other companies during 2004 (in CZK millions):

	Group SME	Group SČE	Other companies	Total
Shares acquired in 2004 from third parties	30.3%	5.9%		
Share of net assets acquired	3,282	434	680	4,396
Goodwill	641	118	–	759
Negative goodwill	–	–	(1)	(1)
Less:				
Non-monetary contributions	–	–	(675)	(675)
Total purchase consideration paid to third parties in cash	3,923	552	4	4,479

The following table summarizes the cash outflows on acquisitions of subsidiaries and minority shares during 2004 (in CZK millions):

Cash outflows on acquisition of subsidiaries	(405)
Cash outflows on purchase of minority shares in REAS	4,479
Change in payables from acquisitions	5,378
Cash paid for financial assets in progress	8,714
Total cash outflows on acquisitions in 2004	18,166

The cash paid for financial assets in progress represents advances and other consideration paid for shares in subsidiaries and associates, for which the ownership rights have not been transferred to the Company at the year-end (see Notes 4 and 28).
From the date of acquisition, the newly acquired subsidiaries have contributed the following balances to the Group's income statement for the year 2004 (in CZK millions):

	ŠKODA PRAHA a.s.	Other subsidiaries acquired	Total
Revenues	723	5	728
Income before other expense (income) and income taxes	225	(7)	218
Net income	93	(11)	82

Acquisitions in 2003

On April 1, 2003, ČEZ acquired majority of the voting shares in 5 Czech electricity distribution companies ("REAS") from Czech National Property Fund and Czech Consolidation Agency. Through the acquisition of REAS ČEZ has also gained control over several other companies, which were owned directly by the respective REAS companies. As the REAS companies and their subsidiaries were acquired from the direct parent of ČEZ and an agency under common control of ČEZ's ultimate parent (Czech government), ČEZ has accounted for this transaction as an acquisition of subsidiaries under common control (see Note 2.3).
The book values of the identifiable assets and liabilities of the REAS companies acquired from companies under common control are as follows (in CZK millions):

	Group SČE	Group SME	Group STE
Shares acquired in 2003 from entities under common control	48.05%	48.65%	58.3%
Shares acquired in previous years*)	2.95%	10.43%	–
Total shares	51.00%	59.08%	58.3%
Property, plant and equipment, net	7,306	10,523	9,741
Deferred income taxes	189	–	–
Other non-current assets	524	1,069	697
Cash and cash equivalents	76	265	33
Other current assets	3,843	7,222	4,346
Minority interests	(1)	–	(8)
Long-term liabilities	(65)	(2,215)	(256)
Deferred income taxes	–	(1,015)	(835)
Current liabilities	(5,839)	(6,065)	(6,738)
Total net assets	6,033	9,784	6,980
Minority interests	(2,956)	(4,004)	(2,911)
Share of net assets acquired	3,077	5,780	4,069
Effect of acquisition of REAS recognized directly in equity	1,660	1,730	(363)
Total purchase consideration	4,737	7,510	3,706
Less:			
Outstanding payables from acquisition	(1,031)	(1,450)	(866)
Consideration paid for shares in previous periods	(327)	(1,310)	–
Cash and cash equivalents in subsidiaries acquired	(76)	(265)	(33)
Cash outflow on acquisition from entities under common control	3,303	4,485	2,807

*) Shares acquired in previous periods have been accounted for as available for sale financial assets in 2002 and 2001, respectively.

	Group VČE	Group ZČE	Total REAS
Shares acquired in 2003 from entities under common control	49.62%	50.26%	
Shares acquired in previous years*)	0.45%	–	
Total shares	50.07%	50.26%	
Property, plant and equipment, net	8,553	5,176	41,299
Deferred income tax	–	–	189
Other non-current assets	259	1,892	4,441
Cash and cash equivalents	151	130	655
Other current assets	4,735	4,302	24,448
Minority interests	(1)	(1)	(11)
Long-term liabilities	(109)	(262)	(2,907)
Deferred income taxes	(952)	(502)	(3,304)
Current liabilities	(5,550)	(4,069)	(28,261)
Total net assets	7,086	6,666	36,549
Minority interests	(3,538)	(3,316)	(16,725)
Share of net assets acquired	3,548	3,350	19,824
Effect of acquisition of REAS recognized directly in equity	356	1,640	5,023
Total purchase consideration	3,904	4,990	24,847
Less:			
Outstanding payables from acquisition	(903)	(1,121)	(5,371)
Consideration paid for shares in previous periods	(41)	–	(1,678)
Cash and cash equivalents in subsidiaries acquired	(151)	(130)	(655)
Cash outflow on acquisition from entities under common control	2,809	3,739	17,143

*) Shares acquired in previous periods have been accounted for as available for sale financial assets in 2002 and 2001, respectively.

During 2003 ČEZ purchased further minority shares in 3 of the REAS from various third parties. The following table summarizes the critical terms of the subsequent acquisitions of minority shares in REAS during 2003 (in CZK millions):

	Group STE	Group VČE	Group ZČE	REAS total
Shares acquired in 2003 from third parties	39.4%	48.76%	48.87%	
Share of net assets acquired	2,578	3,799	4,854	11,231
Goodwill (negative goodwill)	–	–	–	–
Total purchase consideration paid to third parties	2,578	3,799	4,854	11,231

The following table summarizes the cash outflows on acquisitions of subsidiaries during 2003 (in CZK millions):

Cash outflows on acquisition from entities under common control	17,143
Cash outflows on acquisitions from third parties	11,231
Total cash outflows on acquisitions in 2003	28,374

From the date of acquisition, the REAS companies and their subsidiaries have contributed the following balances to the Group's income statement for the year 2003 (in CZK millions):

	Group SČE	Group SME	Group STE
Revenues	8,055	10,900	7,829
Income before other expense (income) and income taxes	725	520	138
Net income	238	286	256

	Group VČE	Group ZČE	Total REAS
Revenues	7,922	5,388	40,094
Income before other expense (income) and income taxes	193	166	1,742
Net income	183	34	997

7. Investments in Subsidiaries and Associates

The consolidated financial statements include the financial statements of ČEZ, a. s., and the subsidiaries and associates listed in the following table:

Subsidiaries	Country of incorporation	% equity[5] interest 2004	% voting interest 2004	% equity[5] interest 2003	% voting interest 2003
Západočeská energetika, a.s.	Czech Republic	99.13	99.13	99.13	99.13
Východočeská energetika, a.s.	Czech Republic	98.83	98.83	98.83	98.83
Středočeská energetická a.s.	Czech Republic	97.72	97.72	97.72	97.72
Severomoravská energetika, a. s.	Czech Republic	89.38	89.38	59.08	59.08
Severočeská energetika, a.s.	Czech Republic	56.93	56.93	51.00	51.00
CEZ FINANCE B. V.	the Netherlands	100.00	100.00	100.00	100.00
ČEZnet, a.s.	Czech Republic	100.00	100.00	100.00	100.00
Energetické opravny, a.s.	Czech Republic	100.00	100.00	100.00	100.00
HYDROČEZ,a.s.	Czech Republic	100.00	100.00	100.00	100.00
I & C Energo a.s.	Czech Republic	100.00	100.00	100.00	100.00
rpg Energiehandel GmbH	Germany	100.00	100.00	100.00	100.00
EN-DATA a.s.	Czech Republic	100.00	100.00	99.13	100.00
VČE - elektrárny, s.r.o.	Czech Republic	98.83	100.00	98.83	100.00
VČE - montáže, a.s.	Czech Republic	98.83	100.00	98.83	100.00
STE - obchodní služby spol. s r.o.	Czech Republic	74.42	76.16	74.42	76.16
Energetika Vítkovice, a.s.	Czech Republic	89.38	100.00	59.08	100.00
ePRIM, a.s.	Czech Republic	89.38	100.00	59.08	100.00
MSEM, a.s.[1]	Czech Republic	89.38	100.00	59.08	100.00
STMEM, a.s.[1]	Czech Republic	–	–	59.08	100.00
Union Leasing, a.s.	Czech Republic	89.38	100.00	59.08	100.00
První energetická a.s.	Czech Republic	87.27	100.00	52.99	62.00
Ústav jaderného výzkumu Řež a.s.	Czech Republic	52.46	52.46	52.46	52.46
ČEZ Správa majetku, s.r.o.[3]	Czech Republic	100.00	100.00	99.99	50.00
ČEZData, s.r.o.[4]	Czech Republic	100.00	100.00	–	–
ČEZ Logistika, s.r.o.[4]	Czech Republic	100.00	100.00	–	–
ČEZ Zákaznické služby, s.r.o.[4]	Czech Republic	100.00	100.00	–	–
ŠKODA PRAHA a.s.[2]	Czech Republic	68.88	68.88	29.80	29.80

Associates	Country of incorporation	% equity interest 2004	% voting interest 2004	% equity interest 2003	% voting interest 2003
ČEPS, a.s.	Czech Republic	–	–	34.00	34.00
KOTOUČ ŠTRAMBERK, spol. s r. o.	Czech Republic	64.87	50.00	64.87	50.00
LOMY MOŘINA spol. s r.o.	Czech Republic	51.05	50.00	51.05	50.00
Plzeňská energetika a.s.	Czech Republic	49.57	50.00	49.57	50.00
KNAUF POČERADY, spol. s r.o.	Czech Republic	40.00	50.00	40.00	50.00
Severočeské doly a.s.	Czech Republic	37.20	37.20	37.20	37.20
Aliatel a.s.	Czech Republic	26.40	30.58	21.10	29.99
Coal Energy, a.s.	Czech Republic	20.00	20.00	20.00	20.00

[1] STMEM, a.s. has merged with MSEM, a.s. during year 2004.
[2] ŠKODA PRAHA a.s. was an associate of ČEZ in 2003.
[3] AB Michle s.r.o. was renamed to ČEZ Správa majetku, s.r.o. and was an associate of ČEZ in 2003.
[4] These companies have been founded in 2004.
[5] The equity interest represents effective ownership interest of the Group.

8. Cash and Cash Equivalents

The composition of cash and cash equivalents at December 31, 2004 and 2003 is as follows (in CZK millions):

	2004	2003
Cash on hand and current accounts with banks	1,704	1,264
Short-term bank notes	4,940	2,501
Term deposits	901	249
Total	7,545	4,014

At December 31, 2004 and 2003, cash and cash equivalents included foreign currency deposits of CZK 1,207 million and CZK 869 million, respectively.
The weighted average interest rate on short-term bank notes and term deposits at December 31, 2004, 2003 and 2002 was 2.2%, 1.7% and 2.6%, respectively. For the years 2004, 2003 and 2002 the weighted average interest rate was 2.1%, 1.9% and 3.0%, respectively.

9. Receivables, Net

The composition of receivables, net, at December 31, 2004 and 2003 is as follows (in CZK millions):

	2004	2003
Unbilled supplies to retail customers	2,203	–
Received advances from retail customer	(2,020)	–
Unbilled supplies to retail customers, net	183	–
Trade receivables	9,911	9,112
Taxes and fees, excluding income taxes	437	205
Other receivables	26	64
Less allowance for doubtful receivables	(1,653)	(2,317)
Total	8,904	7,064

At December 31, 2004 and 2003, the total receivables included receivables from associates and affiliates in the net amount of CZK 434 million and CZK 1,113 million, respectively.

10. Other Current Assets

The composition of other current assets at December 31, 2004 and 2003 is as follows (in CZK millions):

	2004	2003
Securities held for trading	1,340	1,756
Debt securities held to maturity	81	1,476
Advances granted	259	360
Prepayments	496	477
Derivatives	159	230
Total	2,335	4,299

11. Shareholders' Equity

The Company's stated capital as of December 31, 2004 and 2003 is as follows:

	Number of Shares Outstanding	Par Value per Share (CZK)	Total (CZK millions)
		2004	
Registered shares	592,210,843	100	59,221
Treasury shares	(10,000)	100	(3)
Total	592,200,843		59,218
		2003	
Registered shares	592,210,843	100	59,221
Treasury shares	(745,000)	100	(69)
Total	591,465,843		59,152

During 2003 the Company sold 1,190,000 treasury shares. During year 2004 the Company acquired 2,355,000 treasury shares and sold 3,090,000 treasury shares. The remaining 10,000 treasury shares are reflected in the balance sheet at cost as a deduction from stated capital. The profit or loss on sale of treasury shares were included in retained earnings.

In accordance with Czech regulations, joint stock companies are required to establish an undistributable reserve fund for contingencies against possible future losses and other events. Contributions must be a minimum of 20% of after-tax profit in the first year in which profits are made and 5% of profit each year thereafter, until the fund reaches at least 20% of capital. The fund can only be used to offset losses. As of December 31, 2004 and 2003, the balance was CZK 9,913 million and CZK 9,185 million, respectively, and is reported as a component of retained earnings.

Dividends paid per share were CZK 8.0 and CZK 4.5 in 2004 and 2003, respectively. Dividends from 2004 profit will be declared on general meeting, which will be held in June 2005.

12. Long-term Debt

Long-term debt at December 31, 2004 and 2003 is as follows (in CZK millions):

	2004	2003
7.125% Notes, due 2007 (USD 178 million)	3,962	4,545
7.25% Eurobonds, due 2006 (EUR 200 million)	6,233	6,467
4.625% Eurobonds, due 2011 (EUR 400 million)	12,101	–
8.75% Debentures, due 2004 (CZK 3,000 million)	–	3,000
9.22% Zero Coupon Debentures, due 2009[1)]	3,299	3,057
9.22% Debentures, due 2014 (CZK 2,500 million)[2)]	2,494	2,494
3.35% Debentures, due 2008 (CZK 3,000 million)	2,990	2,987
6M PRIBOR + 1.3%, due 2005 (CZK 500 million)	500	500
6M PRIBOR + 0.4%, due 2005 (CZK 1,000 million)	1,000	1,000
Long-term bank loans:		
less than 2.00%	–	4,852
2.00% to 2.99%	5,975	2,787
3.00% to 3.99%	113	286
4.00% to 4.99%	889	–
5.00% to 5.99%	747	2,365
6.00% to 6.99%	324	382
7.00% to 7.99%	887	1,241
8.00% and more	115	693
Total long-term debt	41,629	36,656
Less: Current portion	(3,439)	(5,691)
Long-term debt, net of current portion	38,190	30,965

1) Nominal value of these zero coupon debentures is CZK 4,500 million
2) From 2006 the interest rate changes to consumer price index in the Czech Republic plus 4.2%.

The interest rates indicated above are historical rates for fixed rate debt and current market rates for floating rate debt. The actual interest payments are affected by interest rate risk hedging carried out by the Group. For fair values of interest rate hedging instruments see Note 13.

The future maturities of long-term debt are as follows (in CZK millions):

	2004	2003
Current portion	3,439	5,691
Between 1 and 2 years	8,035	3,696
Between 2 and 3 years	6,162	8,464
Between 3 and 4 years	3,734	7,012
Between 4 and 5 years	3,806	3,769
Thereafter	16,453	8,024
Total long-term debt	41,629	36,656

The following table analyses the long-term debt at December 31, 2004 and 2003 by currency (in millions):

	2004		2003	
	Foreign currency	CZK	Foreign currency	CZK
EUR	643	19,656	258	8,360
USD	405	9,058	454	11,637
CZK	–	12,915	–	16,659
Total long-term debt		41,629		36,656

In the normal course of business, the financial position of the Group is routinely subjected to a variety of risks, including market risk associated with interest rate movements and with currency rate movements on non-Czech crown denominated liabilities. The Group regularly assesses these risks and has established policies and business practices to partially protect against the adverse effects of these and other potential exposures.

As currency rate movements expose the Group to significant risk, the Group uses sensitivity analyses to determine the impacts that market risk exposures may have on the fair values of the Group's financial instruments. To perform sensitivity analyses, the Group assesses the risk of loss in fair values from the impact of hypothetical changes in foreign currency exchange rates and interest rates on market sensitive instruments and considers the expected costs and benefits of various hedging techniques. The Group will continue to explore cost-effective possibilities to reduce its current exchange rate movement and other market risks.

The Company has entered into a number of derivatives transactions, mainly cross-currency swaps, to hedge its long-term debt denominated in foreign currencies against the currency risk and interest rate risk. These hedges are classified as either fair value hedges or cash-flow hedges (see Note 13). As at December 31, 2004, a net unrealized loss of CZK 69 million is included in equity in respect of the cash-flow hedges.

Long-term debt with floating interest rates exposes the Group to interest rate risk. The following table summarizes long-term debt with floating rates of interest by contractual repricing dates at December 31, 2004 and 2003 (in CZK millions):

	2004	2003
Floating rate long-term debt		
with interest rate fixed for 1 month	1,152	1,818
with interest rate fixed from 1 to 3 months	4,584	5,701
with interest rate fixed from 3 months to 1 year	1,242	1,840
with interest rate fixed for more than 1 year	2,494	2,494
Total floating rate long-term debt	9,472	11,853
Fixed rate long-term debt	32,157	24,803
Total long-term debt	41,629	36,656

In 1992 the Company has entered into a loan agreement with the International Bank for Reconstruction and Development. The agreement contains financial covenants relating to capital expenditure coverage, cash flow coverage and debt service coverage. In 2004, 2003 and 2002 the Company has complied with the required covenants.

13. Fair Value of Financial Instruments

Fair value is defined as the amount at which the instrument could be exchanged in a current transaction between knowledgeable willing parties in an arm's length transaction, other than in a forced or liquidation sale. Fair values are obtained from quoted market prices, discounted cash flow models and option pricing models, as appropriate.
The following methods and assumptions are used to estimate the fair value of each class of financial instruments:

Cash and cash equivalents, current investments
The carrying amount of cash and other current financial assets approximates fair value due to the relatively short-term maturity of these financial instruments.

Investments
The fair values of instruments, which are publicly traded on active markets, are estimated based on quoted market prices. For instruments for which there are no quoted market prices the carrying amount approximates the fair value of such investments.

Receivables and Payables
The carrying amount of receivables and payables approximates fair value due to the short-term maturity of these financial instruments.

Short-term loans
The carrying amount approximates fair value because of the short period to maturity of those instruments.

Long-term debt
The fair value of long-term debt is based on the quoted market price for the same or similar issues or on the current rates available for debt with the same maturity profile. The carrying amount of long-term debt and other payables with variable interest rates approximates their fair values.

Derivatives
The fair value of derivatives is based upon mark to market valuations.

Carrying amounts and the estimated fair values of financial instruments at December 31, 2004 and 2003 are as follows (in CZK millions):

	2004		2003	
	Carrying amount	Fair value	Carrying amount	Fair value
Assets:				
Investments	7,474	7,474	10,999	10,999
Receivables	8,904	8,904	7,064	7,064
Cash and cash equivalents	7,545	7,545	4,014	4,014
Liabilities:				
Long-term debt	(41,629)	(43,848)	(36,656)	(39,626)
Short-term loans	(240)	(240)	(2,320)	(2,320)
Accounts payable	(8,234)	(8,234)	(17,548)	(17,548)
Derivatives:				
Cash flows hedges				
Receivables	–	–	–	–
Payables	(1,265)	(1,265)	–	–
Total cash flows hedges	(1,265)	(1,265)	–	–
Fair values hedges				
Receivables	21	21	–	–
Payables	(1,900)	(1,900)	–	–
Total fair values hedges	(1,879)	(1,879)	–	–
Other derivatives				
Receivables	138	138	230	230
Payables	(1,010)	(1,010)	(3,030)	(3,030)
Total other derivatives	(872)	(872)	(2,800)	(2,800)

14. Accumulated Provision for Nuclear Decommissioning and Fuel Storage

ČEZ operates two nuclear power plants, Dukovany and Temelín. Nuclear power plant Dukovany consists of four 440 MW units which were placed into service from 1985 to 1987. The second nuclear power plant, Temelín, has two 1 000 MW units, which have started commercial operation in 2002 and 2003. Czech Republic has enacted a Nuclear Act ("Act"), which defines certain obligations for the decontamination and dismantling ("decommissioning") of the Company's nuclear power plants and the final disposal of radioactive waste and spent fuel ("disposal"). The Act requires that all nuclear parts of plant and equipment be decommissioned following the end of the plant's operating life, currently 2027 for Dukovany and approximately 2042 for Temelín. An updated 2003 Dukovany estimate and a 2004 Temelín decommissioning cost study estimate that nuclear decommissioning will cost CZK 15.6 billion and CZK 13.7 billion, respectively. The Company makes contributions to a restricted account in the amount of the nuclear provisions recorded under the Act. These restricted funds are shown in the balance sheet under other non-current financial assets (see Note 4).
Pursuant to the Act, the Ministry of Industry and Trade established the Radioactive Waste Repository Authority ("RAWRA") as the central organizer and operator of facilities for the final disposal of radioactive waste and spent fuel. The RAWRA centrally organizes, supervises and is responsible for all disposal facilities and for disposal of radioactive waste and spent fuel therein. The activities of the RAWRA are financed through a "nuclear account" funded by the originators of radioactive waste (such as the Company). Contribution to the nuclear account was stated by a government resolution in 1997, at 50 CZK per MWh produced at nuclear power plants. Since October 1, 1997, ČEZ has made regular payments to the nuclear account based on its average nuclear MWh generated during the last 5 years. From 2003 ČEZ is making these payments based on the actual quantity of electricity generated in nuclear power plants in the respective period. The originator of radioactive waste directly covers all costs associated with interim storage of radioactive waste and spent fuel. Actual costs incurred are charged against the accumulated provision for interim and long-term spent fuel storage.
The Group has established provisions as described in Note 2.23, to recognize its estimated liabilities for decommissioning and spent fuel storage. The following is a summary of the provisions for the years ended December 31, 2004, 2003 and 2002 (in CZK millions):

	Accumulated provisions			
	Nuclear Decommissioning	Spent fuel storage Interim	Spent fuel storage Long-term	Total
Balance at December 31, 2001	5,398	2,651	13,347	21,396
Movements during 2002				
Discount accretion	144	70	334	548
Effect of inflation	258	126	600	984
Provision charged to income statement	–	82	–	82
Effect of change in estimate credited to income statement (Note 2.23)	–	(82)	–	(82)
Effect of change in estimate added to (deducted from) fixed assets (Note 2.23)	932	–	(59)	873
Capitalized cost of Temelín provisions	619	254	–	873
Current cash expenditures	–	(135)	(673)	(808)
Balance at December 31, 2002	7,351	2,966	13,549	23,866
Effect of change in group structure	142	4	–	146
Movements during 2003				
Discount accretion	187	74	339	600
Effect of inflation	337	133	610	1,080
Provision charged to income statement	–	113	–	113
Effect of change in estimate credited to income statement (Note 2.23)	–	(56)	–	(56)
Effect of change in estimate added to (deducted from) fixed assets (Note 2.23)	153	–	3,661	3,814
Current cash expenditures	–	(103)	(1,296)	(1,399)
Balance at December 31, 2003	8,170	3,131	16,863	28,164
Movements during 2004				
Discount accretion	202	78	422	702
Effect of inflation	363	141	759	1,263
Provision charged to income statement	–	203	–	203
Effect of change in estimate credited to income statement (Note 2.23)	–	(44)	–	(44)
Effect of change in estimate added to (deducted from) fixed assets (Note 2.23)	359	–	177	536
Current cash expenditures	–	(67)	(1,316)	(1,383)
Balance at December 31, 2004	9,094	3,442	16,905	29,441

The current cash expenditures for the long-term storage of spent nuclear fuel represent payments to the state controlled nuclear account and the expenditures for interim storage represent mainly the purchase of interim fuel storage containers.
The actual decommissioning and spent fuel storage costs could vary substantially from the above estimates because of new regulatory requirements, changes in technology, increased costs of labor, materials, and equipment and/or the actual time required to complete all decommissioning, disposal and storage activities.

15. Short-term Loans

Short-term loans at December 31, 2004 and 2003 are as follows (in CZK millions):

	2004	2003
Short-term bank loans	129	2,295
Bank overdrafts	107	17
Other short-term notes payable	4	8
Total	240	2,320

Interest on short-term loans is variable. The weighted average interest rate was 3.2% at December 31, 2004 and 2.1% at December 31, 2003. For the years 2004, 2003 and 2002 the weighted average interest rate was 4.6%, 2.2% and 3.0%, respectively.

16. Finance Leases

Future minimum lease payments under finance leases together with the present value of the net minimum lease payments are as follows (in CZK millions):

	2004	2003
Within one year	60	31
After one year but not more than five years	27	25
More than five years	–	–
Total minimum lease payments	87	56
Future finance charges on finance leases	(9)	(6)
Present value of finance lease liabilities	78	50

17. Trade and Other Payables

Trade and other payables at December 31, 2004 and 2003 are as follows (in CZK millions):

	2004	2003
Received advances from retail customers	12,374	15,855
Unbilled supplies to retail customers	(11,105)	(12,962)
Received advances from retail customers, net	1,269	2,893
Payables from purchase of REAS	–	7,470
Trade payables	5,925	6,251
Derivatives	4,175	3,031
Other payables	1,040	934
Total	12,409	20,579

At December 31, 2004 and 2003, the total payables included payables from associates and affiliates in the amount of CZK 674 million and CZK 1,192 million, respectively.

18. Accrued Liabilities

Accrued liabilities at December 31, 2004 and 2003 consist of the following (in CZK millions):

	2004	2003
Provisions	2,330	2,811
Accrued interest	929	805
Taxes and fees, excluding income taxes	968	864
Unbilled goods and services	929	546
Social and bonus funds	285	254
Deferred income	463	435
Total	5,904	5,715

19. Sales of Electricity

The composition of sales of electricity at December 31, 2004, 2003 and 2002 is as follows (in CZK millions):

	2004	2003	2002
Sales to distribution companies	13,541	19,843	39,230
Sales to end customer through distribution grid	53,492	36,590	–
Exports of electricity including trade outside the Czech Republic	10,309	13,296	10,143
Sales to traders	5,172	1,592	2,010
Revenues capitalized during construction	–	–	(1,373)
Other domestic sales of electricity	4,943	3,893	2,928
Sales of ancillary services	5,291	4,334	–
Total	92,748	79,548	52,938

20. Other Operating Expenses

Other operating expenses (income), net, for the year ended December 31, 2004, 2003 and 2002 consist of the following (in CZK millions):

	2004	2003	2002
Services	5,031	4,411	3,199
Travel expenses	207	147	34
Loss (gain) on sale of property, plant and equipment	(616)	(326)	20
Loss on sale of material	57	73	136
Capitalization of expenses to the cost of fixed assets and change in own inventory	(1,914)	(1,565)	(437)
Fines, penalties and penalty interest, net	(103)	(43)	(258)
Change in provisions and valuation allowances	(1,480)	359	(71)
Taxes and fees	354	448	466
Write-off of bad debts and cancelled investment	239	146	15
Gifts	254	112	49
Other, net	1,883	(208)	(280)
Total	3,912	3,554	2,873

21. Income Taxes

Income Tax Legislation

Corporate income tax is calculated in accordance with Czech tax regulations at the rate of 28%, 31% and 31% in 2004, 2003 and 2002, respectively. The corporate income tax rate for 2005 will be 26%.

The Czech Republic currently has a number of laws related to various taxes imposed by governmental authorities. Applicable taxes include value-added tax, corporate tax, and payroll (social) taxes, together with others. Tax declarations, together with other legal compliance areas (as examples, customs and currency control matters) are subject to review and investigation by a number of authorities, who are enabled by law to impose severe fines, penalties and interest charges. Management believes that it has adequately provided for tax liabilities in the accompanying financial statements; however, the risk remains those relevant authorities could take differing positions with regard to interpretive issues and the effect could be significant.

Income Tax Provision

The components of the income tax provision are as follows (in CZK millions):

	2004	2003	2002
Current income tax charge	2,484	1,007	450
Adjustments in respect of current income tax of previous periods	154	11	254
Deferred income taxes	1,207	331	2,671
Total	3,845	1,349	3,375

The differences between income tax expense computed at statutory rate and income tax expense provided on earnings are as follows (in CZK millions):

	2004	2003	2002
Income before income taxes	17,928	10,737	11,796
Statutory income tax rate	28%	31%	31%
"Expected" income tax expense	5,020	3,328	3,657
Add (deduct) tax effect of:			
Change in tax rates	(1,008)	(1,561)	–
Czech/IFRS accounting differences	1	78	282
Non deductible provisions, net	(158)	123	(30)
Investment tax relief	(57)	(1,010)	(1,181)
Other non deductible (non taxable) items, net	(104)	140	(117)
Tax credits	(5)	(212)	(103)
Additional tax assessments	154	11	254
Withholding tax on dividend	2	42	–
Difference between carrying and tax value of financial asset	–	410	–
Deferred tax on undistributed profits of subsidiary	–	–	613
Income taxes	3,845	1,349	3,375
Effective tax rate	21%	13%	29%

Deferred Income Taxes, Net

Deferred income taxes at December 31, 2004 and 2003 consist of the following (in CZK millions):

	2004	2003
Accumulated provision for nuclear decommissioning and spent fuel storage	5,925	6,641
CASTOR containers write-off	286	338
Other provisions and allowances	650	885
Tax loss carry forwards	110	25
Revaluation of financial assets	11	17
Other temporary differences	71	171
Total deferred tax assets	7,053	8,077
Tax depreciation in excess of financial statement depreciation	13,103	12,102
Capitalized interest	5,032	5,590
Capitalized cost of provisions	2,927	3,395
Repairs and maintenance accrual	1,206	987
Penalty receivables	46	71
Other temporary differences	38	17
Investment in associates	520	1,490
Total deferred tax liabilities	22,872	23,652
Total deferred tax liabilities, net	15,819	15,575

22. Other Expenses (Income), Net

Other expenses, net, for the year ended December 31, 2004, 2003 and 2002 consist of the following (in CZK millions):

	2004	2003	2002
Derivative losses, net	1,630	1,157	1,643
Loss (gain) on sales of financial investments	(509)	9	(385)
Change in valuation allowances to financial investments	(342)	1,426	(31)
Other, net	(552)	(422)	72
Total	227	2,170	1,299

23. Related Parties

The Company purchases products from related parties in the ordinary course of business. Approximately 59% of the brown coal consumption is supplied by Severočeské doly a.s. ("SD"), a company in which ČEZ holds a 37.2% share. In 2004, 2003 and 2002, coal purchases from SD amounted to CZK 5,054 million, CZK 5,177 million and CZK 4,921 million, respectively. Receivables from SD amounted to CZK 10 million and CZK 10 million as of December 31, 2004 and 2003, respectively. Payables to SD amounted to CZK 535 million and CZK 508 million as of December 31, 2004 and 2003 respectively. The prices of fossil fuel supplies from SD do not differ significantly from market prices.

During 2004, 2003 and 2002 the Company granted share options to the Board of Directors, certain members of the management of the Company and Supervisory Board members. The following table shows changes during 2004, 2003 and 2002 in the number of granted share options and the weighted average exercise price of these options:

	Number of share options	Weighted average exercise price (CZK per share)
Share options at December 31, 2001	3,375,000	92.58
Options granted	30,000	73.30
Options exercised	(30,000)	79.38
Options forfeited	(300,000)	96.39
Share options at December 31, 2002	3,075,000	93.07
Options granted	1,650,000	105.23
Options exercised	(1,190,000)	89.65
Options forfeited	(285,000)	87.83
Share options at December 31, 2003	3,250,000	100.95
Options granted	1,800,000	152.84
Options exercised	(3,090,000)	107.26
Options forfeited	(150,000)	105.78
Share options at December 31, 2004	1,810,000	141.38

At December 31, 2004, the aggregate number of share options granted to members of Board of Directors was 1,350,000 and the number of share options granted to Supervisory Board members was 460,000. The options granted do not have any vesting period and can be exercised during the original terms of office of the respective Board members and in case of options granted after annual shareholders' meeting, which was held on June 17, 2003, the options may exercised during the period when the respective Board member is holding office and in three months after their term of office expires. The exercise price for the granted options was based on the average quoted market price on the Prague stock exchange in the six-month period preceding the date of the grant. In 2004 and 2003 the Company has recognized compensation expense of CZK 148 million and CZK 2 million related to the granted options (see Note 2.26). No expense was recognized in 2002. The Company has settled all options exercised using treasury shares. The gain or loss on the sale of treasury shares were recognized directly in equity.

24. Segment Information

On April 1, 2003 ČEZ sold a majority share in its transmission subsidiary ČEPS, a.s. ("ČEPS") and at the same moment ČEZ acquired majority shares in 5 electricity distribution companies REAS (see Note 1). Following this transaction ČEZ modified its reporting of business segments by including a new distribution segment, which is formed by the 5 majority owned REAS companies. During 2004 ČEZ sold the remaining shares in ČEPS (see Note 25).

The accounting policies of the segments are the same as those described in Note 2. The Group accounts for intersegment revenues and transfers as if the revenues or transfers were to third parties, that is, at current market prices or where the regulation applies at regulated prices. The Group evaluates the performance of its segments and allocates resources to them based on operating income.

The following table summarizes segment information for the years ended December 31, 2004, 2003 and 2002, respectively (in CZK millions):

Year 2004	Power Production	Transmission	Distribution	Other	Combined	Elimination	Consolidated
Sales other than intersegment sales	41,223	–	53,156	5,786	100,165	–	100,165
Intersegment sales	22,986	–	5,728	2,896	31,610	(31,610)	–
Total revenues	64,209	–	58,884	8,682	131,775	(31,610)	100,165
		–					
Operating income	13,048	–	5,971	353	19,372	(217)	19,155
		–					
Identifiable assets	180,425	–	43,759	3,439	227,623	(188)	227,435
Identifiable liabilities	81,571	–	13,066	5,644	100,281	(4,444)	95,837
Investment in associates	356	–	–	7,118	7,474	–	7,474
Income (share of loss) from associates	22	780	–	(68)	734	–	734
Depreciation and amortization	13,969	–	4,004	389	18,362	22	18,384
Change in provisions and allowances	(216)	–	(1,012)	(49)	(1,277)	–	(1,277)

Year 2003	Power Production	Transmission	Distribution	Other	Combined	Elimination	Consolidated
Sales other than intersegment sales	40,756	3,569	38,373	2,118	84,816	–	84,816
Intersegment sales	14,936	152	657	2,768	18,513	(18,513)	–
Total revenues	55,692	3,721	39,030	4,886	103,329	(18,513)	84,816
Operating income	9,884	758	2,017	90	12,749	255	13,004
Identifiable assets	190,364	–	44,215	2,084	236,663	(67)	236,596
Identifiable liabilities	85,240	–	15,965	2,608	103,813	(1,971)	101,842
Investment in associates	333	2,924	–	7,742	10,999	–	10,999
Income (share of loss) from associates	(23)	630	–	456	1,063	–	1,063
Depreciation and amortization	13,558	476	2,962	220	17,216	(255)	16,961
Change in provisions and allowances	384	4	67	16	471	–	471

Year 2002	Power Production	Transmission	Distribution	Other	Combined	Elimination	Consolidated
Sales other than intersegment sales	43,651	11,927	–	–	55,578	–	55,578
Intersegment sales	6,235	441	–	–	6,676	(6,676)	–
Total revenues	49,886	12,368	–	–	62,254	(6,676)	55,578
Operating income	9,539	661	–	–	10,200	1,023	11,223
Identifiable assets	195,747	17,899	–	–	213,646	(10,219)	203,427
Identifiable liabilities	74,462	3,704	–	–	78,166	(2,917)	75,249
Investment in associate	–	–	–	5,880	5,880	–	5,880
Income from associate	–	–	–	497	497	–	497
Depreciation and amortization	10,869	1,865	–	–	12,734	(1,013)	11,721
Change in provisions and allowances	10	2	–	–	12	–	12

The power generation segment sells the major part of its electricity generated to the eight REAS.

Prices in certain intersegment transactions are regulated by the Energy Regulatory Office (see Note 1).

25. Discontinuing Operation

On March 11, 2002 the Government decided to purchase from ČEZ a 66% share in its transmission subsidiary ČEPS. General meeting of ČEZ's shareholders held on June 11, 2002, has confirmed the above mentioned decision of the Government. This transaction was carried out on April 1, 2003. Based on the decision of Economic Competition Protection Authority ČEZ has also sold its remaining equity share in ČEPS in September 2004.

The purchase of ČEPS shares was made by OSINEK, a.s., a company controlled by the National Property Fund, and the Ministry of Labor and Social Affairs and the Ministry of Finance. Based on the fact that the transaction was carried out between parties under common control of ČEZ's ultimate parent, ČEZ has recorded the net gain on the sale directly in equity. The composition of the amount recorded in equity in 2004 and 2003 is as follows (in CZK millions):

	2004	2003
% of shares sold	34%	66%
Total selling price	7,087	15,224
Book value of shares sold	(3,703)	(4,453)
Current income tax related to the sale	(1,721)	(4,152)
Deferred tax related to the sale	773	543
Effect of sale recognized in equity	2,436	7,162

The reconciliation of the proceeds from disposal of a subsidiary as presented in the cash-flow statement in 2004 and 2003 is as follows (in CZK millions):

	2004	2003
Total selling price	7,087	15,224
Cash disposed of	–	(3,016)
Change in receivables from the sale of subsidiary or associate	(7,087)	–
Proceeds from disposal of subsidiary, net of cash disposed of	–	12,208

The operations of ČEPS were reported in the transmission segment (see Note 24).

The carrying amounts of total assets and total liabilities attributable to the discontinuing operation at December 31, 2004 and 2003 are as follows (in CZK millions):

	2004	2003
Total assets	–	2,924*)
Total liabilities	–	–
Total net assets disposed off	–	2,924

*) The amount represents investment in associate only.

The amounts shown above in respect of 2003 do not include the deferred tax liability from consolidation of undistributed retained earnings of ČEPS.

The following items of income, expenses and cash flows can be attributed to the discontinuing operation (in CZK millions):

	2004	2003	2002
Total revenues	–	2,023	5,692
Operating profit	–	1,013	1,684
Income from associate	780	630	–
Income before income taxes	780	1,609	1,531
Income tax expense	–	302	470
Cash flow from operating activities	–	1,055	1,460
Cash flow from investing activities	–	(113)	(477)
Cash flow from financing activities	–	–	–

The income tax expense shown above does not include deferred tax from consolidation of undistributed retained earnings of ČEPS.

26. Net Income per Share

	2004	2003	2002
Numerator – basic and diluted (CZK millions)			
Net income	13,059	8,869	8,421
Denominator (thousands shares)			
Basic:			
Weighted average shares outstanding	592,075	590,772	590,363
Dilutive effect of treasury shares	136	1,439	1,787
Diluted:			
Adjusted weighted average shares	592,211	592,211	592,150
Net income per share (CZK per share)			
Basic	22.1	15.0	14.3
Diluted	22.1	15.0	14.2

27. Commitment and Contingencies

Investment Program

The Group is engaged in a continuous construction program, currently estimated as of December 31, 2004 to total CZK 105.6 billion over the next five years, as follows: CZK 17.3 billion in 2005, CZK 19.9 billion in 2006, CZK 23.4 billion in 2007, CZK 22.4 billion in 2008 and CZK 22.6 billion 2009. These figures do not include the expected acquisitions of subsidiaries and associates, which in accordance with the estimated free cash flows can amount up to CZK 90 billion in the period 2005 through 2009. The actual payments for acquisitions will depend on the number of future investment opportunities, for which the Company will be successful bidder and also considering the recoverability of these investments.

The construction programs are subject to periodic reviews and actual construction may vary from the above estimates. At December 31, 2004 significant purchase commitments were outstanding in connection with the construction program.

The Company currently projects that its planned construction expenditures will be funded mainly with cash provided by operating activities.

Environmental Matters

The Czech Republic has adopted a series of environmental acts and laws and regulations (“the Acts”) including a timetable for the reduction of atmospheric emissions in the period from 1992 through December 31, 1998. As of December 31, 1998, all plants operated by the Company had been upgraded to meet the environmental requirements of the Acts.

The Company is also liable under the Acts for past environmental damage. In 2004, 2003 and 2002, payments made to state farms, individual farms, cooperatives, other agricultural firms and forests totaled CZK 4 million, CZK 6 million and CZK 9 million, respectively. Based on current estimates of its probable future obligations, the Company provided CZK 40 million in 2004, CZK 40 million in 2003 and CZK 47 million in 2002, respectively, for pollution damages. In 2004, 2003 and 2002 the Company further reversed CZK 36 million, CZK 54 million and CZK 72 million, respectively. Although uncertainties exist due to interpretations of applicable laws, management does not believe, based upon the information available at this time, that the ultimate outcome of these matters will have a material adverse effect on the Company’s financial position or results of operations.

Insurance Matters

The Nuclear Act (see Note 14) sets limits for liabilities for nuclear damages by the operator of nuclear installations/licenses. The Nuclear Act provides that operators of nuclear facilities are liable for up to CZK 6 billion per incident. The Nuclear Act limits the liability for damage caused by other activities (such as transportation) to CZK 1.5 billion. The Nuclear Act also requires an operator/licensee to insure its liability connected with the operation of a nuclear power plant up to a minimum of CZK 1.5 billion and up to a minimum of CZK 200 million for other activities (such as transportation). ČEZ has obtained all insurance policies with minimal limits as required by the law. ČEZ concluded about mentioned insurance policies with Czech nuclear pool, a group of insurance companies.

ČEZ has renewed insurance policies covering the assets of its fossil, hydro and nuclear power plants, insurance policies covering non-technological equipment, general third party liability insurance in connection with main operations of the Company and car insurance.

ČEZ and the Group companies have insurance policies covering directors and officers liability. ČEZ also controls other property and liability insurance policies of the Group companies.

28. Events After the Balance Sheet Date

On January 18, 2005, ČEZ obtained 67% share in three Bulgarian electricity distribution companies, Elektrorazpredelenie Pleven EAD, Elektrorazpredelenie Sofia Oblast EAD and Elektrorazpredelenie Stolichno EAD. For this acquisition the Company has paid in cash a total of EUR 281.5 million (see Notes 4 and 6). The valuation of assets and liabilities of the acquired companies was not finalized as of the date, when these financial statements have been authorized for issue.
On April 5, 2005, ČEZ signed an agreement about the privatization of a Romanian distribution company Electrica Oltenia. Through this transaction ČEZ will acquire 51% share in the company for a total amount of EUR 151 million.

29. Presentation of Financial Statements

The accompanying consolidated financial statements are presented on the basis of International Financial Reporting Standards and Interpretations issued by the International Accounting Standards Board. Certain accounting principles generally accepted in the Czech Republic ("CAS") do not conform to IFRS used in preparing the accompanying consolidated financial statements. A description of the significant adjustments required to conform the Company's statutory balances to consolidated financial statements prepared in accordance with IFRS is set forth in the following tables.
The effect on retained earnings and other reserves of differences in IFRS and CAS is as follows (in CZK millions):

	December 31, 2004	December 31, 2003
Balance per CAS (standalone)	88,523	79,863
Impact of consolidation	1,109	(635)
Balance per CAS (consolidated)	89,632	79,228
Accumulated provision for nuclear decommissioning and spent fuel storage (Note 14)	(14,569)	(14,415)
Capitalized costs of nuclear provisions	12,195	12,125
CASTOR containers write-off	(1,191)	(1,209)
Deferred tax on nuclear provisions, capitalized costs of nuclear provisions and CASTOR containers write-off, net	865	971
Reversal of repairs and maintenance accrual, net of deferred tax	3,647	2,545
Impact of CAS/IFRS accounting differences on the associates, net of deferred tax	(537)	(247)
Interest capitalized, net of deferred tax	17,705	16,829
Depreciation of interest capitalized, net of deferred tax	(3,383)	(2,455)
Grants received, net of deferred tax	(550)	(670)
Gain (loss) on derivatives, net of deferred tax	2	–
Other IAS 39 differences	94	43
Electrometers, net of deferred tax	779	970
Finance leases – lessee, net of deferred tax	102	109
Share options	–	18
Rights, net of deferred tax	(54)	(116)
Revaluation on acquisition	2	(5)
Reclassification of items from retained earnings, net	(246)	(223)
Other differences	(22)	(26)
Balance per IFRS	104,471	93,472

The effect on net income of differences in IFRS and CAS is as follows (in CZK millions):

	Year ended December 31, 2004	2003	2002
Net income per CAS (standalone)	12,364	13,931	6,713
Impact of consolidation	1,416	1,648	608
Net income per CAS (consolidated)	13,780	15,579	7,321
Accumulated provision for nuclear decommissioning and spent fuel storage (Note 14)	406	889	413
Capitalized costs of nuclear provisions	(466)	(344)	(261)
CASTOR containers write-off	17	(26)	(63)
Deferred tax on nuclear provisions, capitalized costs of nuclear provisions and CASTOR containers write-off, net	(130)	(266)	(28)
Reversal of repairs and maintenance accrual, net of deferred tax	1,095	179	170
Impact of CAS/IFRS accounting differences on the associates, net of deferred tax	(319)	(10)	91
Interest capitalized, net of deferred tax	876	1,348	1,405
Depreciation of interest capitalized, net of deferred tax	(928)	(835)	(471)
Grants received, net of deferred tax	51	32	34
Gain (loss) on derivatives, net of deferred tax	1,188	(263)	580
Additional foreign exchange rate differences under IAS 39, net of deferred tax	–	–	(577)
Other IAS 39 differences, net of deferred tax	50	(12)	(85)
Electrometers, net of deferred tax	(102)	21	–
Finance leases – lessee, net of deferred tax	(1)	4	–
Share options	(148)	(2)	–
Rights, net of deferred tax	28	(17)	–
Revaluation on acquisition	9	(5)	–
Sale of ČEPS, a.s., net of tax	(2,436)	(7,162)	–
(Profit) loss on sale of treasury shares	223	5	(18)
Reclassification of items from retained earnings, net	(232)	(220)	(90)
Other differences	98	(26)	–
Net income per IFRS	13,059	8,869	8,421

The Czech Republic's position on the EC recommendation for the management of financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste

The Czech Republic thanks the Commission for its efforts to boost fair competition in the internal market for electricity and for its continuing concern for nuclear safety. However, we have several comments on this issue :

General :

We feel strongly that a subject as important as fair competition in the internal market for electricity should be addressed in the form of a directive rather than as simply a recommendation.

As regards the perceived link between nuclear safety and accumulated funds for decommissioning, we feel that the one is not necessarily dependant on the other. In other words safe decommissioning can be successfully achieved even if earmarked funds have not been accumulated prior to decommissioning.

Comments on the recommendation :

1) Preamble (19): Rather than independent management of financial resources safe or secure management should be stated.
2) Preamble (19): Dedicated national body or <u>bodies</u> should also be put in place so as to provide an expert judgment concerning nuclear safety and decommissioning cost matters.
3) Section 2 definition (a): Definition of decommissioning should not include spent fuel disposal. For example standard IAEA definition can be used. We recommend that a distinction should be made between funds for decommissioning and spent fuel management (disposal). Consequently we feel that two financial arrangements might be used depending on specific national circumstances.
4) Section 3 (4): Distinction between funds for decommissioning and spent fuel management should be made.
5) Section 5 (8, 9): We do not feel that the ring-fenced external fund option as recommended by the Commission is necessary for meeting the requirements of a fair internal market in electricity and the requirements concerning transparency.

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DECREE

of the State Office for Nuclear Safety

of June 3, 2003

On decommissioning of nuclear installation or category III or IV workplace

The State Office for Nuclear Safety, pursuant to Section 47 paragraph 7 to implement Section 9, paragraph 1 g) and Section 13 paragraph 3 d) of Act No. 18/1997 Coll. on Peaceful Utilisation of Nuclear Energy and Ionising Radiation (the Atomic Act) and on amendments and alterations to some acts, as amended by Act No. 13/2002 Coll. (hereinafter "the Act") establishes as follows:

PART ONE

INTRODUCTORY PROVISIONS

Section 1

Scope

The Decree sets out the scope and method of decommissioning of nuclear installation or category III or IV workplace (hereinafter the “workplace”), which has to be authorized by the State Office for Nuclear Safety (hereinafter “the Office”) and furthermore it sets out the scope and form of documentation for the licensed activity, which is to be approved by the Office.

Section 2

Basic Terms

For the purpose of this Decree the following terms have the respective meaning:

a) decommissioning activities– activities performed within decommissioning of a nuclear installation or a workplace, primarily decontamination, dismantling, demolition, collection, separation, conditioning, processing, storage, transport and disposal of radioactive waste resulting from decommissioning, implementation of protective barriers and other measures in order to ensure radiation protection,

b) termination of operation – the set of activities leading to termination of use of nuclear installation or workplace or to using for different purposes other than these approved under Section 9, paragraph 1 of the Act,

c) stage of decommissioning – a section limited in time and extent, during which decommissioning activities are performed,

d) termination of decommissioning – decommissioning of nuclear installation or workplace without any restrictions, decommissioning with limited using for radiation practices other than these approved under Article 9, paragraph 1 of the Act, or decommissioning of repositories of radioactive waste connected to further monitoring of their effect on the environment under Section 26, paragraph 3 letter a) of the Act.

PART TWO

METHOD AND EXTENT OF DECOMMISSIONING

Section 3

Method of Decommissioning

Methods of decommissioning of nuclear installations or workplaces are:

a) immediate decommissioning, when the decommissioning activities are performed consequently from the moment of start of decommissioning until its end; or

b) deferred decommissioning, when the decommissioning activities are divided into several consequential stages limited in time and extent, which can be delayed one from another.

Section 4

Extent of decommissioning

(1) Decommissioning activities shall be performed under individual stages.

(2) The decommissioning stages include termination of operation, preparations for liquidation and liquidation itself. Regarding the method of decommissioning, the decommissioning can be performed within one stage according to an approved proposal of method of decommissioning. For individual decommissioning stages a licence is required.

(3) Individual decommissioning stages shall be finished by securing protective barriers for still non-decommissioned equipment, buildings, systems and components of a nuclear installation or workplace against prohibited dispersion of radionuclides into the environment.

Section 5

Preparation for decommissioning

Upon preparation for decommissioning of nuclear installation or workplace, the following always shall be considered:

a) physical condition of the nuclear installation or workplace, including evaluation of stability of buildings, technological parts, systems and components,

b) securing nuclear safety, radiation protection, physical protection and emergency preparedness according to the conditions of a licence issued under Section 9, paragraph 1 of the Act,

c) method of handling of radioactive waste, including its composition and quantity, transport, processing, conditioning, storing and disposal of radioactive waste,[1] including securing minimization of radioactive waste from decommissioning activities,

d) preparedness of the staff and availability of technology, which is supposed to be used in decommissioning, including decontamination, dismantling and demolition, as well as the possibilities of remote technical operations,

e) method of re-use and recycling of materials, systems and components from decommissioning,

f) estimation of costs of decommissioning and availability of financial funds,

g) effects of the proposed decommissioning activities on the environment and public,

h) planned use of the area of nuclear installation and workplace after terminating the operation according to the urban planning documentation.

Section 6

Termination of decommissioning

(1) Immediately after termination of the decommissioning activities, the holder of the licence for decommissioning of nuclear installation or workplace shall submit an inform about ending the decommissioning to the Office, in which, according to the type of workplace, shall be proved that nuclear safety, radiation protection, emergency preparedness and physical protection according to the special regulation[2] have been secured.

(2) In the case an area of nuclear installation or workplace cannot be released for unrestricted use, adequate measures have to be taken in order to secure control over the area corresponding to the conditions of the area from the radiation protection viewpoint.[3]

PART THREE

EXTENT AND METHOD OF REALIZATION OF DOCUMENTATION RELATED TO THE DECOMMISSIONING

Section 7

Documentation

(1) Documentation related to the decommissioning of nuclear installation and workplace has to be realized with regard to the condition and history of operation of the nuclear installation or workplace. A proposal of decommissioning of nuclear installation or workplace method along with an estimate of costs of

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1) Articles 46 to 52 of ordinance No. 307/202 of the Coll., on protection against radiation

2) Ordinance No. 307/2002 of the Coll.

3) Articles 101 and 102 of ordinance No. 307/2002 of the Coll.

decommissioning shall be updated at least every 5 years. The mentioned documents are to be submitted simultaneously.

(2) In case the operation will be terminated due to extraordinary events, the originally planned method of decommissioning shall be re-evaluated and the documentation, with regard to such facts, shall be up-dated.

Section 8

Proposal of a method of nuclear installation or category III or IV workplace decommissioning

(1) The proposal of method of nuclear installation decommissioning includes, depending on the extent and method of decommissioning activities, the following:

a) description of the nuclear installation, including both technological and constructional parts, before termination of operation,

b) planned date of starting the decommissioning activities, reasoning of the proposed method and extent of decommissioning and used technological procedures, including their availability and verification in practice, time schedule of the decommissioning activities and their objective,

c) supposed radionuclide composition of the compounds contained in the nuclear installation as per the moment before terminating its operation, evaluation of their type, activity, toxicity, volume, mass, physical and chemical form,

d) supposed type and quantity of generated radioactive waste and description of proposed handling with radioactive waste including its release into the environment,

e) description of handling with spent nuclear fuel and other nuclear materials,

f) method of securing physical protection during the decommissioning,

g) method of securing emergency preparedness and analysis of possible extraordinary situations and their initiation events, including analysis of radiation risks and impact assessment of the decommissioning activities on the staff, public and environment,

h) proposal of organizational preparations and staffing of the decommissioning process,

i) planned use of the area of the nuclear installation during and after the decommissioning, including description of changes in the surroundings of the nuclear installation resulted from its operation and supposed effects on the surroundings caused by the decommissioning.

(2) Upon processing documentation for category III or IV workplace, which is not a nuclear installation, the extent and method of decommissioning shall be taken into account as well as the source of ionizing radiation, which was handled in the given workplace; one stage decommissioning usually takes place. For a plant that was not required to be granted with a licence according to Section 9, paragraph 1, letter l) of the Act, documentation under paragraph 1, letter e) is not required. For a plant, where the method of securing physical safety under Section 13, paragraph 6

of the Act was not approved, documentation under paragraph 1 letter f) is not required. Documentation mentioned in paragraph 1 letter d) is to be processed only in case radioactive waste are handled in the workplace, or in case substances contaminated with radionuclides generated during its operation are released into the environment upon decommissioning.

(3) Assessment of costs of decommissioning that form a part of documentation submitted within the request for a licence under Section 9, paragraph 1, letters c) and d) of the Act after being certified by the Radioactive Waste Repository Agency, shall be elaborated as a sum of costs of individual decommissioning activities used for the proposed decommissioning method with regard to the supposed time schedule of decommissioning activities for regular prices of the year, when the assessment was made. The schedule of decommissioning activities shall include a description of the considered decommissioning activities, costs of such decommissioning activities and the supposed year or of their realization. The estimate of costs of individual decommissioning activities shall be, if applicable, elaborated as a multiplication of the number of proposed units and the price per unit.

Section 9

Temporary Provision

The proposal of decommissioning method prepared by the holder of the licence and approved by the Office before the date of the Decree takes effect, shall be rewritten by the holder of the licence in accordance with the requirement hereof before December 31, 2007.

Section 10

Quashing Provisions

Decree No. 196/1999 Coll. on decommissioning of nuclear installation or workplaces with significant or very significant sources of ionizing radiation is hereby repealed.

Section 11

Efficiency

This Decree enters into force since the date of its publication.

Chairwoman:

Ing. Drábová

Czech Republic

National Report

under the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

National Report

under the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

Revision 2.3

September 2005

Table of Content

LIST OF ABBREVIATIONS AND SELECTED TERMS

Atomic Act	Act No. 18/1997 Coll., on peaceful utilization of nuclear energy and ionizing radiation and on amendments to and alterations of some acts as enacted later
BAPP	auxiliary service building for primary systems (NPP Dukovany)
BPP	auxiliary building (NPP Temelín)
ČR	Czech Republic
ČSKAE	Czechoslovak Atomic Energy Commission
DGR	deep geological repository
EDU	ČEZ, a. s., Nuclear Power Plant Dukovany
EOAR	equivalent volume activity of radon
ERC	Emergency Response Center
ETE	ČEZ, a. s., Nuclear Power Plant Temelín
EU	European Union
FA	fuel assembly
FDS	fragmentation and decontamination center
FJFI	Faculty of nuclear and physical engineering, Czech Technical University in Prague
FNM ČR	National Property Fund of the Czech Republic
HLW	high level waste
HM	heavy metal
HSP	ČEZ, a. s., Central Office Prague
HVB	main production building
I.O.	primary circuit
II.O.	secondary circuit
IAEA	International Atomic Energy Agency
ICRP	International Committee for Radiation Protection
INES	International Nuclear Event Scale
IRRT	International Regulatory Review Team
IRS	Incident Reporting System
ISFSF	Interim Spent Fuel Storage Facility
Joint Convention	the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management
k_{eff}	effective neutron multiplication coefficient (ratio of the number of neutrons in the n^{th} and $(n-1)^{st}$ fission generation in the final environment)
LVR	light water reactor
MPO	Ministry of the Industry and Trade of the Czech Republic
MV	Ministry of the Interior of the Czech Republic
MŽP	Ministry of the Environment of the Czech Republic
National Report	National Report by the Czech Republic under the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management
NI	nuclear installation
NPP	Nuclear Power Plant
PE	polyethylene

Policy	Policy for radioactive wastes management and spent fuel management in the Czech Republic approved by the Czech Government's Resolution No. 487 of 15 May 2002
PZJ	quality assurance program
RAW	radioactive waste
RF	Russian Federation
SF	spent fuel
SFSF	Spent Fuel Storage Facility
SÚJB	State Office for Nuclear Safety (or Office)
SÚJCHBO	State Institute for Nuclear, Chemical and Biological Protection
SÚRAO	Radioactive Wastes Repository Authority (or Authority)
SÚRO	State Institute for Radiation Protection
SVO	special water purification system
ŠTK	transfer cask shaft (under ČEZ, a. s. terminology also shaft No. 1)
ÚJF Řež	Nuclear Physics Institute Řež
ÚJV Řež a. s.	Nuclear Research Institute Řež a. s.
ÚKŠ	Central Crisis Staff (or Staff)
ÚVVVR	Institute for Research, Production and Utilization of Radioisotopes, Prague
VVER	type identification of light water reactors designed in the former Soviet Union

Summary

On 25 March 1999 the Government of the Czech Republic approved the Joint Convention which came into effect in the Czech Republic on 18 June 2001. In agreement with the obligations resulting from its accession to the Joint Convention the Czech Republic has already drawn the second National Report for the purposes of Review Meetings of the Contracting Parties, which describes the system of spent fuel and radioactive waste management in the scope required by selected articles of the Joint Convention. The information contained in this report were gathered and updated as at 31 December 2004, unless stated otherwise. Meanwhile, at the national level the National Report serves as a source of up-to-date publicly available information (http://www.sujb.cz) on methods of spent fuel and radioactive waste management in all facilities subject to the Joint Convention.

Results from the First Review Meeting of the Contracting Parties to the Joint Convention in 2003 and the existing practices make it possible to conclude that spent fuel and radioactive waste management in the Czech Republic fully complies with the Joint Convention articles. The Atomic Act and its implementing decrees form a legislative base for all activities in spent fuel and radioactive waste management and clearly define responsibilities of license holders for the achieved level of nuclear safety, radiation protection, emergency preparedness and physical protection. Specific activities were completed and started before the end of 2004, which:

- have ensured and will ensure that long-term storage of spent fuel from all operated nuclear power plants on the Czech Republic's territory is performed, in agreement with the approved governmental Policy, in type-approved casks placed in dry spent fuel stores at the NPP Dukovany and NPP Temelín sites,
- will significantly improve nuclear safety and radiation protection in management of spent fuel from research reactors and in connection with these activities the spent fuel will be transported in 2006 or later to the Russian Federation under the international project "Russian Research Reactor Fuel Return" which is a part of the "Global Threat Reduction Initiative" supported by IAEA and by the US Government,
- are related to the ongoing safe storage and disposal of selected categories of operating and institutional low-level and intermediate-level radioactive wastes in near-surface repositories operated by the state organization SÚRAO, established by MPO to provide for activities associated with disposal of radioactive wastes.

The following activities, which have been planned for 2005 – 2010 to improve the safety of spent fuel and radioactive waste management, should be mentioned:

- application of new technologies for immobilization of operating radioactive sludge and ion exchangers so that the resulting form of radioactive waste can be safely disposed of in the Dukovany repository. The technologies will ensure safe disposal of all categories of operating low- and intermediate-level radioactive wastes which meet waste acceptance criteria for the Dukovany repository,
- continuation of the rehabilitation of environmental contamination at the site of ÚJV Řež a. s., including transport of spent fuel from research reactors to the Russian Federation,
- projects of closing of selected disposal chambers in the Richard and Bratrství repositories.

In the long-term prospective the key activity foreseen in spent fuel and radioactive waste management will be development of a national deep geological repository which should start its operation after 2065.

In conclusion, SÚJB as a state administration body responsible for elaboration of this report, would like to express its thanks for the support provided in the process of report development by the following organizations dealing with spent fuel and radioactive waste management in the Czech Republic: ČEZ, a. s., ÚJV Řež a. s., SÚRAO a s. p. DIAMO.

1. Introduction

This report is the National Report submitted by the Czech Republic for the purposes of the Second Review Meeting of the Contracting Parties to the Joint Convention. Its objective is to describe the fulfillment status of obligations under the Joint Convention in the Czech Republic as at 31 December 2004. The outline of the National Report is based on recommendations approved at the Preparatory Meeting of the Contracting Parties to the Joint Convention held December 2001 and contained in the „Guidelines regarding the form and structure of national reports (INFCIRC/604)" of 1 July 2002.

By the mentioned date several facilities were in operation in the Czech Republic that are subject to the Joint Convention. The NPP Dukovany site, owned by ČEZ, a. s. with four reactor units VVER 440/213, in addition to power generating units also includes the following nuclear installations:

- ISFSF Dukovany – in commercial operation since 1997,
- RAW repository Dukovany – in commercial operation since 1995, owned by the state since 2000.

SFSF Dukovany, under construction since April 2004, will be after its completion and license issue another nuclear installation at the site (its commissioning is scheduled in the second half of 2006).

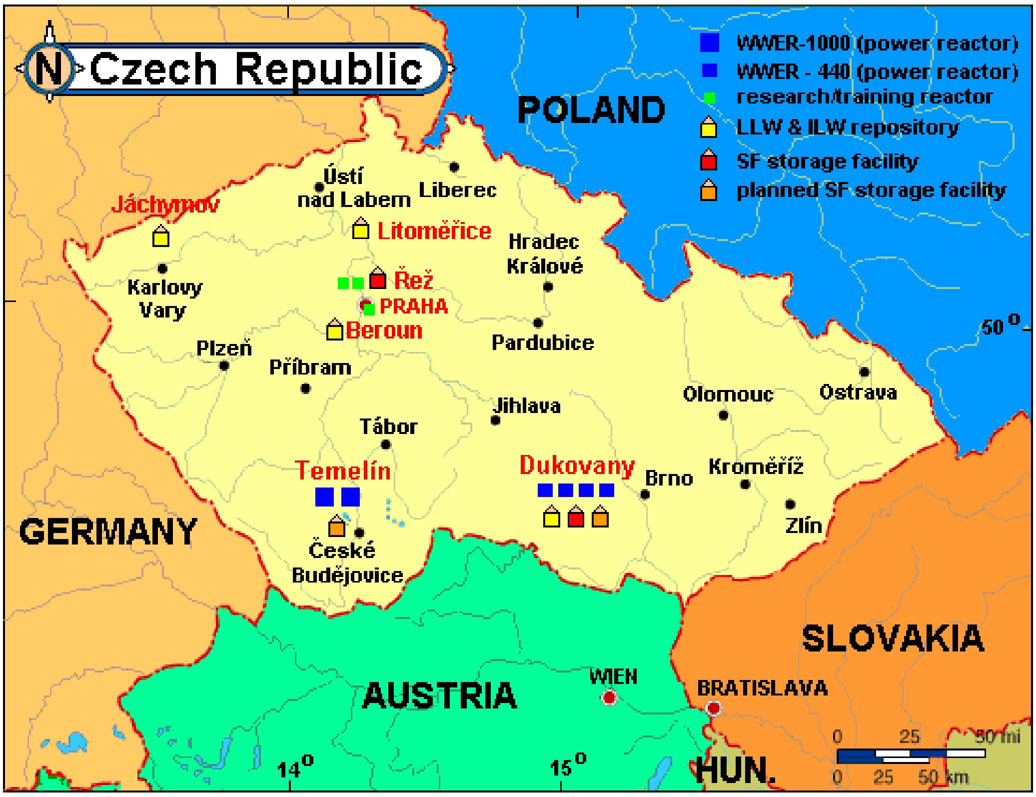

Fig. 1.1 Locations of selected nuclear installations and facilities subject to the Joint Convention in the Czech Republic

In addition to the separate nuclear installations the NPP Dukovany site also includes SF pools and ŠTK in each production unit to handle SF. Similar facilities - SF pools and ŠTK are also a part of NPP Temelín, which features two reactor units VVER 1000/320.

SF produced by operation of the research reactor LVR–15 in ÚJV Řež a. s. is stored in the HLW storage facility, which is in agreement with the Czech law classified as an independent nuclear installation. The other research reactors in ÚJV Řež a. s. (LR–0) and FJFI Prague (VR–1) do not produce any SF due to their small thermal output and limited time of operation.

In addition to RAW repository Dukovany, which is used to dispose RAW from the operation of nuclear power plants, there are the following storage facilities on the Czech Republic's territory:

- RAW repository Hostím in Beroun (operated in 1959-1964; decommissioned in 1997),
- RAW repository Richard in Litoměřice (institutional waste; in operation since 1964),
- RAW repository Bratrství in Jáchymov (permanent disposal of wastes contaminated with natural radionuclides; in operation since 1974).

2. Categorization of RAW and Policy for Radioactive Waste Management and Spent Fuel Management – Art. 32 paragraph 1 of the Joint Convention

1. In accordance with the provisions of Article 30, each Contracting Party shall submit a national report to each review meeting of Contracting Parties. This report shall address the measures taken to implement each of the obligations of the Convention. For each Contracting Party the report shall also address its:

(i) spent fuel management policy;
(ii) spent fuel management practices;
(iii) radioactive waste management policy;
(iv) radioactive waste management practices;
(v) criteria used to define and categorize radioactive waste.

2.1 Categorization of RAW

In agreement with the Atomic Act radioactive waste is defined as „substances, objects or equipment containing or contaminated by radionuclides for which no further use is foreseen".

In agreement with Decree No. 307/2002 Coll., on radiation protection, RAW include gaseous, liquid and solid wastes. Solid RAW are divided into three basic categories - temporary, low- and intermediate- and high-level radioactive wastes:

- transient RAW are wastes whose radioactivity after long-term storage (up to 5 years) is lower than release levels,
- low- and intermediate-level RAW are divided into two sub-groups: short-lived, whose half-life of radionuclides (including ^{137}Cs) is shorter than 30 years and with limited mass activity of long-lived alpha sources (in an individual CASK up to 4000 kBq/kg and the mean value 400 kBq/kg in the total volume of waste produced in one calendar year), and long-lived which include other wastes than those in the short-lived RAW sub-group,
- for HLW their storage and disposal shall take into account release of heat from decay of radionuclides contained therein.

SF shall not be considered RAW under the Atomic Act unless its has been classified as RAW by its owner or by SÚJB. Storage of SF shall be subject to the same requirements as RAW before disposal and SF shall be stored in a manner that does not aggravate its further treatment.

Natural materials produced in the course of mining and treatment of uranium ores are also subject to Act No. 44/1988 Coll., on protection and use of mineral riches (Mining Act), and therefore they are not covered by e.g. the Policy. Their repositories contain exclusively natural radionuclides and they are not considered nuclear installations under the Atomic Act.

2.2 Policy for Radioactive Waste Management and Spent Fuel Management

The Policy, approved by the Czech Government on 15 May 2002 (Government Resolution No. 487/2002), is-the fundamental document defining a strategy of the state and its agencies in RAW management (produced both by nuclear installations and workplaces with sources of ionizing radiation in healthcare, research and industry) by about 2025, with an outlook to the end of the 21st century, in respect to generators of RAW and SF. The Policy uses the following main principles:

- management of RAW and SF in the Czech Republic is provided for by authorized private entities and SÚRAO and, if needed, the SÚRAO will also provide extended services for the generators,
- liquidation of low- and intermediate-level short-lived RAW in the Czech Republic is performed by their safe disposal in the existing near-surface repositories whose operation has been continually evaluated and economically optimized,
- one of the options to liquidate low-and intermediate-level long-lived RAW which does not meet an acceptance criteria of existing repositories and HLW is their disposal in DGR; before the facility is put into operation these materials will be stored with their generators or in facilities of the SÚRAO,
- technology procedures for RAW management and preparation to implement DGR in the Czech Republic have been in agreement with the legislative requirements and results of foreign research and technology developments. Simultaneously, possibilities of SF reprocessing are monitored and assessed, as well as the use of new technologies leading to reduction of SF volume and toxicity,
- the costs of activities associated with disposal of RAW and SF are paid from the nuclear account, a financial source created by generators of RAW and SF in agreement with the Atomic Act and established government order, while the nuclear account as a part of the state financial assets and liabilities and is managed by the Ministry of Finance. This assures that the costs of disposal for wastes generated now will not be transferred to future generations,
- general public is kept informed about the Policy and about its fulfillment.

Management of RAW and SF, as described in the following chapters of this Report, is performed in agreement with the Policy. As at 31 December 2004 no major changes were made in the Policy which was described in detail in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1 of February 2003.

3. Scope of Application – Article 3 of the Joint Convention

1. *This Convention shall apply to the safety of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as part of a reprocessing activity is not covered in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management.*

2. *This Convention shall also apply to the safety of radioactive waste management when the radioactive waste results from civilian applications. However, this Convention shall not apply to waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source or it is declared as radioactive waste for the purposes of this Convention by the Contracting Party.*

3. *This Convention shall not apply to the safety of management of spent fuel or radioactive waste within military or defense programs, unless declared as spent fuel or radioactive waste for the purposes of this Convention by the Contracting Party. However, this Convention shall apply to the safety of management of spent fuel and radioactive waste from military or defense programs if and when such materials are transferred permanently to and managed within exclusively civilian programs.*

4. *This Convention shall also apply to discharges as provided for in Articles 4, 7, 11, 14, 24 and 26.*

The Policy does not anticipate reprocessing of SF from operation of power generating reactors in the Czech Republic. The use of SF reprocessing is justifiable if its economic or safety benefits have been demonstrated. The existing prices in the preceding part of the fuel cycle, particularly prices of natural uranium, are currently making SF reprocessing economically disadvantageous. From the viewpoint of safety, reprocessing does not significantly increase radiation risks but from the viewpoint of disposal, reprocessing or treatment procedures for RAW from reprocessing, enable separation of long-lived and risky radionuclides and therefore also their optimum treatment before final disposal. On the other hand, the requirements for a deep repository design to accommodate HLW from SF reprocessing are more demanding than in case of direct disposal of SF.

Beyond the scope of requirements in Article 3 of the Joint Convention, the chapter 12.9 of the first National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1 of February 2003, provides basic information about residues after mining and treatment of uranium ores which contain natural radionuclides. Materials produced during the mining and treatment of uranium ores and not placed in repositories are concentrated in pits and tailing ponds. Due to the contained radioactive materials these facilities are subject to all applicable criteria for radiation protection. Their overview is provided an appendix section hereto.

Under the Atomic Act, nuclear energy may be in the Czech Republic used only for peaceful purposes and therefore the Czech Republic participates in no projects for military utilization of nuclear energy. For this reason the SF and RAW on the Czech Republic's territory comes exclusively from peaceful utilization of nuclear energy.

4. Inventory and List of Facilities for SF and RAW Management – Article 32 paragraph 2 of the Joint Convention

2. This report shall also include:

(i) a list of the spent fuel management facilities subject to this Convention, their location, main purpose and essential features;

(ii) an inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;

(iii) a list of the radioactive waste management facilities subject to this Convention, their location, main purpose and essential features;

(iv) an inventory of radioactive waste that is subject to this Convention that is being held in storage at radioactive waste management and nuclear fuel cycle facilities; has been disposed of; or has resulted from past practices. This inventory shall contain a description of the material and other appropriate information available, such as volume or mass, activity and specific radionuclides;

(v) a list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.

4.1 Inventory and Facilities for SF Management

This part of the National Report contains a list and brief descriptions of facilities used for SF management in nuclear power and research facilities. Along with the information provided in Chapter 7, this Chapter 4 contains details concerning the following SF management facilities:

- for the NPP Dukovany – SF pools and ISFSF Dukovany,
- for the NPP Temelín – SF pools,
- for the ÚJV Řež a. s. – wet accumulator tank for SF, SF storage facility and HLW storage facility.

4.1.1 Nuclear Power Plant Dukovany

The basic description of NPP Dukovany units, including the main technical specifications, is provided in the National Report submitted by the Czech Republic under the Convention on Nuclear Safety of September 2001.

4.1.1.1 SF Pools

To assure safe storage of SF removed from reactors, SF pool is provided next to each reactor unit, its volume being 335 m^3, and the SF is stored in it for a period of time required to reduce the residual heat output. After that period the thermal output and radiation of SF assemblies drops to a level permitting their transport in CASTOR-440/84 type-approved casks for transport and storage in ISFSF Dukovany. The storage pools for SF assure the following functions:

- undercriticality of the stored SF,
- removal of residual heat from PS,
- protection against radioactive radiation.

In the pools the SF is stored in a compact grid with the capacity of 682 positions. SF Pools also contains 17 positions for hermetic cases to store damaged SF. Depending on the number of removed FA in the annual reactor campaign, the pools enable to store SF for a period of at least 7 years. Only in case of emergency removal of fuel from the core or during inspection of the reactor pressure vessel, a reserve grid is inserted into SF pool.

Fig. 4.1 Uncovered SF pool and ŠTK during reactor refueling

As at 31 December 2004 all four pools contained 2270 FAs with the total weight 488 050 kg, with the weight of heavy metals about 271 000 kg.

4.1.1.2 ISFSF Dukovany

ISFSF Dukovany, situated inside the NPP Dukovany site, is designed for dry storage of SF in CASTOR-440/84 casks. A central building of ISFSF Dukovany is a ground-level hall with a combined structural system, with fixed poles from reinforced concrete and steel roof structure with a 6-meter module. The poles bear a crane runway and roof steel open-web girders supporting the roof structure. The building shell is mounted from panels made of reinforced concrete 100 mm thick. The storage part of the building is surrounded with a shielding concrete wall 5 m high and 500 mm thick. The floor is a slab of reinforced concrete with dust-free consolidating surface finish.

ISFSF Dukovany is an independently functioning unit linked by utility networks to the networks of NPP Dukovany. It has a railway siding and road links to the reactor units of NPP Dukovany.

The total capacity of ISFSF Dukovany is 60 casks, while on 31 December 2004 ISFSF Dukovany contained 54 CASTOR-440/84 casks and 1 filled casks was prepared in the reactor hall of unit 1 to be transported to the ISFSF. 4-5 containers are moved to ISFSF Dukovany every year.

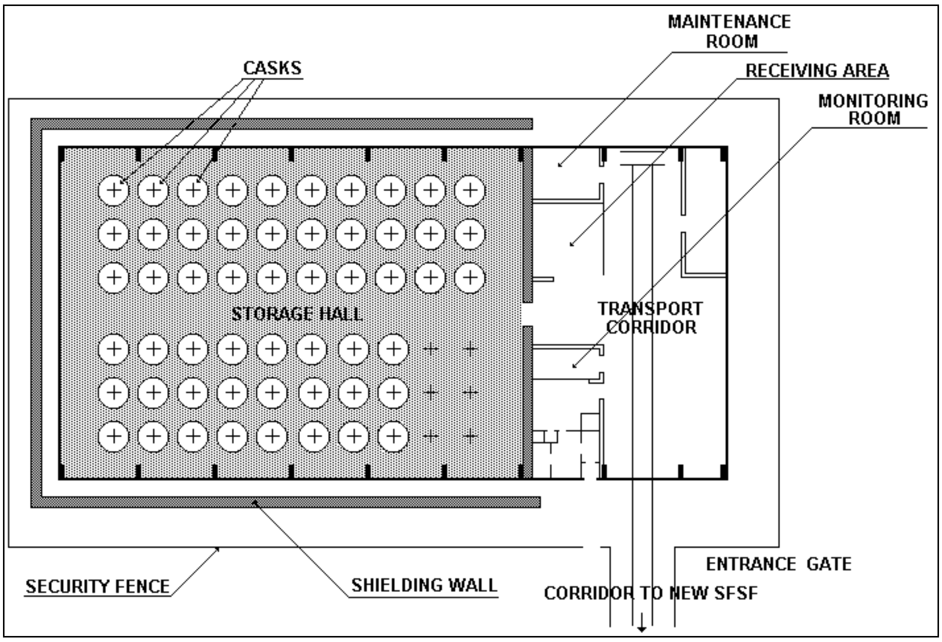

Fig. 4.2 Ground plan of ISFSF Dukovany

4.1.2 Nuclear Power Plant Temelín

The basic description of NPP Temelín units, including the main technical specifications, is provided in the National Report submitted by the Czech Republic under the Convention on Nuclear Safety of September 2001.

4.1.2.1 SF Pools

Similarly as in NPP Dukovany, the main production building in NPP Temelín has a storage pool for SF removed from the reactor with the volume 1440 m^3, immediately next to the reactor well. The removed SF is stored here for a period of 12 years (in the course of NPP operation) or for at least 5 years (after NPP operation is closed) in a storage pool. SF pool is divided into 3 parts: two bigger parts have two grid sections each and the third has only one storage grid section.

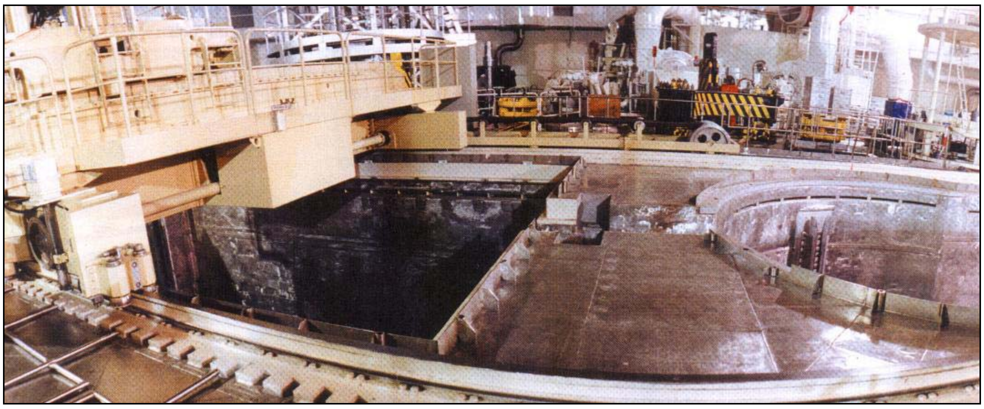

Fig. 4.3 Uncovered SF pool at NPP Temelín

The entire SF pool enables to store 678 FAs, 25 FAs in hermetic cases and 2 cluster cases (one position is used now). In a standard storage regime, however, at least 163 positions shall remain free for potential emergency removal of assemblies from the entire reactor core.

As on 31 December 2004 SF pool of NPP Temelín in unit 1 contained 84 FAs and SF pool in unit 2 contained 42 FAs.

4.1.3 ÚJV Řež a. s.

A basic description of the research reactor LVR-15, including its main technical specifications, is provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1 of February 2003.

4.1.3.1 SF Pool in the Reactor Hall

The SF pool is designed to store SF removed from the reactor core of LVR-15. It is an aluminum vessel in the floor of the reactor hall, protected with concrete on all sides and a steel-plated case. The vessel is covered with three cast iron plates 500 mm thick. The plates have two handling openings with lids. The upper edge of the reactor vessel is connected to the tank with a sloping pipe ending at the tank bottom. In 1996 the fuel was taken out from the wet accumulator tank and its condition inspected. The level and physical and chemical parameters of water in the tank are continually monitored.

As at 31 December 2004 the tank contained 30 FAs IRT-2M with the initial enrichment 36% wt. ^{235}U.

4.1.3.2 Building 211/7 – SF Storage Facility

The object includes two pools - A and B. The internal dimensions of pool A are 230 x 120 cm, depth 6 m and of pool B 440 x 120 cm, depth 6 m. The stated length includes a 50 cm long handling recess. The pools are built of heavy concrete cast between the inner and outer jacket of the stainless steel vessel. The pool walls and bottom are made of stainless steel inner jacket, 50 cm of heavy concrete and outer stainless steel jacket. No pipes pass through the walls or bottom. The pools are provided with a filtration equipment. Water for filtration and its recycling are conducted inside the pool. The pools do not have any discharge openings in the bottoms.

Racks made of aluminum alloy are placed on the pool bottom to store SF. To suspend experimental devices the pool walls are provided with holders ca. 30 cm below the upper edge. Dry channels are made of concrete, diameter 20 cm, and 5,5 m deep. The channels are drained to the active waste sewers. The object has a forced ventilation system with an outlet to the object roof. 3 USIT 1-2B measuring probes are installed in the object to measure dose rate of beta and gamma radiation of STADOS system, with the set up signal level 0,1 mSv/h. During SF handling the object is provided with a Kopr-type volume activity meter for alpha and beta aerosols in the air. The object is connected with the reactor hall via a gate and outhouse.

There is a railway track between the reactor hall and the object in which an electric track car transports casks with SF or radioactive parts of the experimental equipment with high dose rate.

The facility premises are used for temporary storage of activated probes, loops and other active material (pool B) and temporary storage of SF (pool A). Accessories of the pools include a water treatment circuit and a water pump with output 60 l/min. In addition to the pools the facility also features six dry stainless steel storage channels sunk in the floor. Shielding of the active equipment in the pools is provided with a layer of water and in dry channels with steel lids. Activated equipment from the reactor hall is transported in cask with a special self-propelled electric track car. The area is provided with a bridge crane with a crab. Shielded casks are used to transport SF and activated parts of probes and loops from the reactor into the wet accumulator tank and storage facility and to transport SF from the storage facility to the HLW storage facility (Building 211/8).

As at 31 December 2004 the facility contained 51 FAs IRT-2M with the initial enrichment 36% wt. ^{235}U and 12 FAs IRT-2M with the initial enrichment 80 % wt. ^{235}U (from which 2 were in hermetic cases).

4.1.3.3 Building 211/8 – HLW Storage Facility

The high-level waste storage facility is designed to store solid RAW and spent fuel produced in ÚJV Řež a. s. in the research reactor VVR–S or LVR–15, developed as a result of an extensive reconstruction of the original Soviet research reactor VVR–S, and at its research workplaces.

The facility was built in 1981 – 1988. Subsequently, modifications were made to meet SÚJB requirements. The facility construction was completed in 1995. Its trial operation started in 1995 and since 1997 the facility has been in permanent operation.

The building is a prefabricated hall, ca. 13 × 34 m and 15 m tall. The interior is made up of eight concrete boxes of square ground plan for dry storage of solid RAW and SF type EK–10 (used in the VVR–S reactor until 1975) and two cylindrical pools for wet storage of SF type IRT–M.

The SF EK–10 is stored in dry conditions, in drums backfilled with concrete. The pools consist of inner stainless steel vessel placed in another vessel of carbon steel embedded in concrete. The pool diameter is 4,6 m and water level 5 m. The storage capacity in the pool A is 300 FAs and in the pool B 465 FAs. The storage space in the boxes is horizontally divided with concrete panels into three levels. The upper cover is made of two shielding panels. The boxes dimensions are 5,75 x 5,75 m, 5 m tall.

The storage facility has a gate into the entrance hall adapted for transport means. The facility is also provided with an emergency exit at the hall's back part.

The facility also includes a station for demineralized water MIX 1000 to produce and maintain the required quality of shielding water in the pool, situated next to the entrance hall. The demi-water station area includes a storage tank for liquid RAW, which include particularly water from ion exchangers regeneration and rinse water. From here liquid RAW are pumped to a transport tank to be moved to Building 241 (RAW management facility Velké zbytky), where they are processed along with other liquid RAW.

Ventilation of the storage facility is provided with an air outlet without any air supply systems. Air outlet ventilators operate when the operating personnel is present in the object. An electric bridge crane is used for handling purposes, with the loading capacity 12,5 t. The facility is provided with a radiation monitoring system.

The HLW storage facility is provided with a signaling system responding to the following parameters:

- tightness of inner tanks with a system of capacity sensors detecting leakage of water from the pool,
- level meter for shielding water in the pool,
- level meter for liquid RAW in the storage well of the demi-water station,
- operation of ventilators,
- dose rate of the stable dosimetric system,
- radioactive aerosols in the air (in trial-operation in 2005),
- conductivity of shielding water in the SF pool, with an automatic startup of the demi-water station.

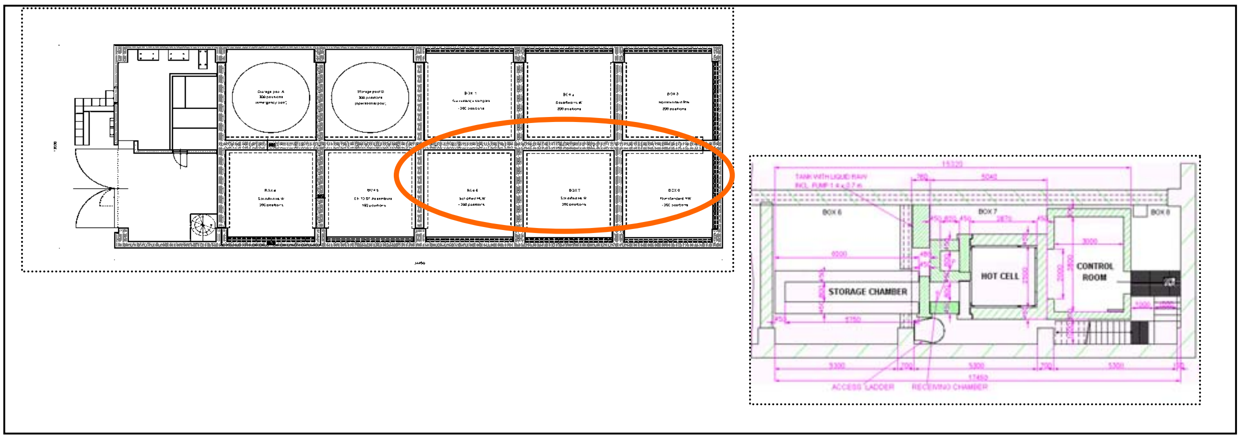

Fig. 4.4 Ground plan of the HLW storage facility

Light signaling of all these parameters is situated on a control panel in the storage hall. The signals are also run to the control panel in the building 241 and continually monitored. The facility is provided with an electronic security system.

The facility safety is assured with a multi-barrier system. The system consists of the inner and outer vessel, insulation of the boxes and the entire building. There is a drainage system under the building, connected to a tank with the volume of 6 m^3, from which water samples are collected on regular basis to determine the content of radionuclides. Samples are regularly collected from drill wells situated around the facility to determine the content of radionuclides.

As a part of rehabilitation efforts to remove old environmental liabilities, which involve liquidation of radioactive contamination and RAW and relocation of SF into the HLW storage facility, the HLW storage facility is being refurbished. On 9 April 2003 a contract was signed for rehabilitation works to redress environmental damage, between FNM ČR and ÚJV Řež a.s. SF management will be required particularly under the item No. 22 – relocation of fuel EK-10 into HLW storage facility and item No. 23 – relocation of fuel IRT-M into HLW storage facility.

The spent nuclear fuel of EK-10 type from operation of the research reactor in 1958 – 1975 was stored in 200 l drums backfilled with concrete in building 211/6 – Reloading center for RAW, which was not originally designed for SF storage. The transport to the building 211/6 occurred in 1969 – 1975. As the storage failed to provide sufficient radiation protection in the research institute and beyond, the EK-10 SF was transported in 200 l drums (190 of them) in 1996-1997 to the HLW storage facility.

The current condition of EK-10 SF in drums is unknown. The most critical aspect is that the storage containers are not hermetically sealed. The fact is associated with corrosion of fuel assembly cladding which may result in a release of radioactive materials outside the storage containers. Moreover, the storage containers may lose their integrity as a result of age and material used to manufacture them. Therefore the EK-10 fuel needs to be inserted into new hermetic cases. Re-packaging of the fuel from the existing 200 l drums into hermetic cases will take place in a hot cell developed, along with other necessary technology, in the HLW storage facility. Encased fuel will be placed in Škoda VPVR/M cask's baskets and subsequently placed in a storage installation (storage safe) adjoining on the hot cell. Construction works in the HLW storage were completed on 31 December 2004 and preparations have started to install operation technologies.

As at 31 December 2004 the pool B contained 256 FAs in total, from which 16 of EK-10 type (enrichment 10 % wt. ^{235}U) and 240 of IRT–2M type (enrichment 80 % wt. ^{235}U). The thermal power of the FAs was 569.54 W as at 18 August 2003. The total number of storage units containing EK-10 type fuel in the dry store in the HLW storage box No. V is 190.

4.2 Inventory and Facilities for RAW Management

4.2.1 Nuclear Power Plant Dukovany

The NPP Dukovany generates liquid, solid and gaseous RAW. Facilities for RAW management are listed by the individual types of radioactive wastes in the chapters below.

4.2.1.1 Solid RAW

4.2.1.1.1 Management of solid RAW

- Low-level RAW

  Management of low-level solid RAW consists of the following stages:

  - controlled collection and primary segregation of solid RAW by the type is performed at stable assigned places (60 stable collection points and additional may be established on as needed basis, particularly during regular and general repairs of the units). The collection points are provided with PE bags and metallic casks for minor metallic waste. Solid RAW with dose equivalent rate > 1mSv/h are stored in shielded boxes at the place of their generation. The collected waste is transported to BAPP,
  - Measuring and segregation of solid RAW – primary measuring and segregation of solid RAW based on their radioactivity is performed with hand-held devices and a measuring carousel.
  - Discharge of solid RAW into the environment – the part of solid RAW suitable for discharge into the environment is officially measured to determine the content of radionuclides. The waste meeting criteria of Decree No. 307/2002 Coll. is discharged into the environment or disposed of on the dump for solid municipal waste Petrůvky without requiring a permit to be issued by SÚJB,
  - Storage of solid RAW – RAW which cannot be discharged into the environment is stored in an organized manner in box pallets with the volume 0.4 m^3 or, after low-pressure compacting (15 t) in 200 litters galvanized casks in BAPP storage vaults.

- Intermediate-level RAW (wastes that fail to meet criteria for disposal in RAW Repository, non-generating heat)

  RAW, that due to their high specific activity of radionuclides cannot be disposed in RAW repository are stored in an organized manner in storage premises for radioactive items and their final conditioning and disposal will be addressed within decommissioning of NPP.

4.2.1.1.2 Equipment for processing of solid RAW

- Low-level RAW

  Although the concept for management of solid RAW established in 1980s anticipated a wider range of technologies for solid RAW processing, at the moment only low-pressure compacting is available. Another technology to minimize the final volume of solid RAW was high-pressure compacting in 1996 (using a rented high-pressure compactor). In early 2005 additional equipment was introduced to reduce the volume of solid RAW (waste crusher, cable insulation ripper).

- Intermediate-level RAW

  Intermediate-level RAW is not treated, only fragmented (if practicable) and stored under control in the storage facility for radioactive items.

4.2.1.1.3 Facility for storage of solid RAW

- Low-level solid RAW

  The system for storage of low-level solid RAW is situated in BAPP. It consists of 13 concrete pools sized 6 x 9 x 11 m. The pool floors are at the level - 1.3 m. The pool ceilings are covered at +10.80 m with in-situ concrete blocks 600 x 96 x 30 cm (weight 4.4 t) or closed with hermetic closures (in three layers) sized 170 x 170 cm. Over the storage facility, at the level +10,80 m, there is a steel hall 9 x 60 x 8 m, which encloses the whole area over the pools. The hall has a 5 t crane and a grip to handle monolith panels, hermetic closures and to move box pallets with solid RAW into the pools. At present 8 pools are being used from the total number of 13 pools:

  - 4 pools in BAPP 108/2, 3, 4, 5 are equipped with built-in structures for palleting. The pools are used for storage of solid RAW in box pallets or in 200 l casks. Each pool is covered with 8 monolith panels. The structure inside divides each pool into 32 units (1 unit:1206 x 860 mm). Each unit accommodates 20 mutually fitting pallets stacked on one another,
  - 1 pool is designed to store spent air-conditioning filters. The pool is divided into 48 units, each with a built-in steel structure 600 x 600 mm. Each unit is covered with a hermetic closure,
  - 3 pools are kept as a reserve to store solid non-standard RAW, that are difficult to process to fit into a box pallet. Each pool has 6 openings covered with hermetic closures.

- Intermediate-level solid RAW

  Intermediate-level solid RAW are kept in the storage facility for active items in the reactor hall (in the so-called "mogilnik") A, B 314 and on the floor ±0.0 m A, B 101/1A, B101/1,2. The anticipated storage time is until NPP decommissioning.

4.2.1.2 Liquid RAW

4.2.1.2.1 Facility for conditioning of liquid RAW

Liquid RAW generated in the process of cleaning and treatment of liquid radioactive media are collected and subsequently stored in BAPP in storage tanks with the volume of 460 or 550 m^3.

Further processing of radioactive concentrates into a form acceptable for RAW Repository Dukovany is performed with bituminization technology. Bitumen-based product is than disposed in 200 l galvanized casks in RAW Repository Dukovany. At the moment, no treatment of radioactive sludge and ion exchangers is performed.

Fig. 4.5 View of a bituminization line to process liquid RAW

4.2.1.2.2 Facilities to store liquid RAW

The system for storage of liquid RAW consists of:

- storage tanks for radioactive concentrate with the total volume 2680 m^3 (4x550+460m^3) per a double reactor unit,
- emergency tanks for radioactive concentrate with the volume of 460 m^3,
- tanks for active sorbents with the volume of 460 m^3 each,
- pumps and auxiliary technology equipment.

Liquid RAW of the organic origin (oils) are stored in 200 l metallic drums. There are safety tanks under them to accommodate the whole volume of the stored drums.

Tab. 4.1 Comparison of the actually stored RAW with the limits and conditions for storage as at 31 December 2004

Waste type	The maximum permitted quantity to be stored	The actually stored quantity
liquid RAW – concentrates of active waters	4500 m^3	2424 m^3
liquid RAW – spent ion exchangers	460 m^3	303 m^3
solid RAW total	1000 t	495 t
Treated RAW in casks stored in buildings 809 PS–48 ZRAW	500 drums	22 drums

4.2.1.3 Gaseous RAW

4.2.1.3.1 Equipment to collect gaseous RAW

Gaseous RAW are removed with the venting technology systems (piping, tanks) and ventilation systems (space).

4.2.1.3.2 Equipment for treatment of gaseous RAW

Gaseous RAW are processed by the technological systems for venting and ventilation - gaseous RAW are either treated or held-up. The treatment includes filtration of radioactive aerosols, including radioactive iodine in aerosol form. The hold-up means the gas flow is slowed down and the activity of short-lived radionuclides drops. The processing of gaseous RAW results in solid RAW and a gaseous medium meeting requirements for discharge into the environment.

Tab 4.2. Activity of gaseous effluences

		Year				
Radionuclide	**Activity A effective dose E Use of annual limit L**	**2000**	**2001**	**2002**	**2003**	**2004**
$^{89+90}$Sr	A [Bq]	$1.196 . 10^{5}$	$3.786 . 10^{5}$	$1.124 . 10^{5}$	$1.101 . 10^{5}$	$3.605 . 10^{4}$
	E [Sv]	$1.3 . 10^{-12}$	$1.45 . 10^{-11}$	$9 . 10^{-13}$	$8 . 10^{-13}$	$7 . 10^{-13}$
	L [%]	$3.3 . 10^{-6}$	$3.6 . 10^{-5}$	$2.3 . 10^{-6}$	$2 . 10^{-6}$	$1.7 . 10^{-6}$
Ra-iodine (^{131}I)	A [Bq]	$1.547 . 10^{8}$	$1.58 . 10^{7}$	$1.063 . 10^{7}$	$1.078 . 10^{7}$	$1.564 . 10^{7}$
	E [Sv]	$2.073 . 10^{-10}$	$2.12 . 10^{-11}$	$1.42 . 10^{-11}$	$1.44 . 10^{-11}$	$2.1 . 10^{-11}$
	L [%]	$5.2 . 10^{-4}$	$5.3 . 10^{-5}$	$3.56 . 10^{-5}$	$3.61 . 10^{-5}$	$5.24 . 10^{-5}$
Ra-noble gases	A [Bq]	$9.87 . 10^{12}$	$3.67 . 10^{12}$	$3.608 . 10^{12}$	$3.551 . 10^{12}$	$6.662 . 10^{12}$
	E [Sv]	$2.55 . 10^{-8}$	$6.2732 . 10^{-9}$	$6.231 . 10^{-9}$	$6.926 . 10^{-9}$	$1.182 . 10^{-8}$
	L [%]	$6.387 . 10^{-2}$	$1.568 . 10^{-2}$	$1.558 . 10^{-2}$	$1.731 . 10^{-2}$	$2.955 . 10^{-2}$
Ra-aerosols	A [Bq]	$6.38 . 10^{7}$	$7.42 . 10^{7}$	$5.53 . 10^{7}$	$2.241. 10^{8}$	$4.811 . 10^{7}$
	E [Sv]	$2.55 . 10^{-8}$	$6.2732 . 10^{-9}$	$3.7377 . 10^{-9}$	$1.343 . 10^{-8}$	$3.277 . 10^{-9}$
	L [%]	$1.057 . 10^{-2}$	$1.335 . 10^{-2}$	$9.344 . 10^{-3}$	$3.375 . 10^{-2}$	$8.194 . 10^{-3}$
Tritium (^{3} H)	A [Bq]	$2.455 . 10^{11}$	$1.862 . 10^{11}$	$9.26 . 10^{10}$	$8.508 . 10^{11}$	$8.135 . 10^{11}$
	E [Sv]	$1.276 . 10^{-10}$	$9.68 . 10^{-11}$	$4.82 . 10^{-11}$	$4.424 . 10^{-10}$	$4.23 . 10^{-10}$
	L [%]	$3.19 . 10^{-4}$	$2.42 . 10^{-4}$	$1.20 4 . 10^{-5}$	$1.106 . 10^{-3}$	$1.057 . 10^{-3}$
^{14}C	A [Bq]	$3.409 . 10^{11}$	$3.186 . 10^{11}$	$3.659 . 10^{11}$	$5.917 . 10^{11}$	$8.0376 . 10^{11}$
	E [Sv]	$6.58 . 10^{-8}$	$6.15 . 10^{-8}$	$7.06 . 10^{-8}$	$1.142 . 10^{-7}$	$1.551 . 10^{-7}$
	L [%]	0.1645	0.1537	0.1765	0.2855	0.3878
Transuranium elements	A [Bq]	$2.05.10^{4}$	$1.76 . 10^{4}$	$3.26 . 10^{4}$	$3.2 . 10^{3}$	$7.78 . 10^{3}$
	E [Sv]	0.00	0.00	0.000	0.0	0.0
	L [%)	0.00	0.00	0.000	0.0	0.0
TOTAL	**D [Sv]**	**$9.591 . 10^{-8}$**	**$7.324 . 10^{-8}$**	**$8.0653 . 10^{-8}$**	**$1.3501 . 10^{-7}$**	**$1.7067 . 10^{-7}$**
TOTAL+II.O.	**D [Sv]**	**$9.591 . 10^{-8}$**	**$7.324 . 10^{-8}$**	**$8.0653 . 10^{-8}$**	**$1.3501 . 10^{-7}$**	**$1.7067 . 10^{-7}$**
TOTAL	**L [%]**	**0.2398**	**0.1831**	**0.2016**	**0.3375**	**0.4267**
Air	[mil.m^{3}]	9703	10108	9807	10092	10576

4.2.2 Nuclear Power Plant Temelín

The operation of NPP Temelín produces liquid, solid and gaseous RAW.

- Liquid radioactive media are processed in special treatment stations so that the treated water may be used again in the plant and separated radioactive materials may be processed and disposed. Liquid concentrates and spent ion exchangers are temporarily stored in the tanks of the radioactive concentrates storage facility and from there transported for bitumenization in BPP. The operation of the plant by the end of 2004 had produced 940.6 m^3 of radioactive concentrate in total. From this volume 569.1 m^3 have been processed on the bitumenization line.
- Solid RAW are stored in storage facilities for solid RAW.
- The philosophy for gaseous RAW processing is fairly simple: separation of radioactive materials from contaminated gasses by filtration.

4.2.2.1 Solid RAW

Tab. 4.3 Solid RAW produced from the beginning of operation to 31 December 2004

Year	**Total**	**Low-pressure compacting**	
	[t]	[t]	[m^3]
2000	**-**	**-**	**-**
2001	0.5	-	-
2002	21.3	0.5	1.2
2003	100.6	10.6	24.4
2004	106.7	12.7	38.8
TOTAL	**229.1**	**23.8**	**64.4**

Note:

Data in the column „Total [t]“ include all solid RAW with the dose rate > 1 μGy/hour. This waste is sorted as follows:

- non-active (discharged into the environment)
- radioactive (low-pressure compacting into 200 l casks, stored in BAPP)

4.2.2.2 Gaseous RAW

The following tables list activities of gaseous effluences, effective doses caused by them to an individual from a critical group of population and contributions of individual radionuclide groups to the drawing on the established limit for gaseous effluences, for the period from 1 January 2003 to 31 December 2004:

Tab. 4.4 Activity of gaseous effluences

Radionuclide	Activity/ Effective dose	Year	
		2003	2004
$^{89+90}$ Sr	A [kBq]	0.00	0.00
	E [μSv]	0.00	0.00
RI	A [MBq]	3.8138	122.7381
	E [μSv]	0.00	0.0001
Noble gases	A [GBq]	34382.97	6484.5967
	E [μSv]	0.1317	0.0295
Aerosols	A [kBq]	374365.3	27931.4021
	E [μSv]	0.1294	0.0003
Tritium	A [GBq]	325.5978	1299.2604
	E [μSv]	0.0016	0.0066
^{14}C	A [GBq]	334.6364	409.4883
	E [μSv]	0.6191	0.7578
Transuranium elements	A [kBq]	46.7782	47.3519
	E [μSv]	0.0004	0.0004
TOTAL	**D [μSv]**	**0.8822**	**0.7945**
TOTAL+II.O.	**D [μSv]**	**0.8822**	**0.7945**
Air	[mil.m^3]	1 265.527	5734.9561

Tab. 4.5 Contributions by individual radionuclide groups to drawing on limits for total annual effluences

Radionuclide	Year	
	2003	2004
$^{89+90}$ Sr	0.0000 %	0.0000 %
RI	0.0000 %	0.0003 %
Noble gases	0.3293 %	0.0738 %
Aerosols	0.3235 %	0.0008 %
Tritium	0.0042%	0.0185 %
^{14}C	1.5477 %	1.8939 %
Transuranium elements	0.0010 %	0.0010
TOTAL	**2.2055%**	**1.9862 %**
TOTAL+II.O.	**2.2055 %**	**1.9862 %**

The established limit is an authorized limit for the effective dose from external exposure and effective dose load for an individual from the critical group of population, as established for ETE by SÚJB at 40 μSv/year. The limit is based on the optimized limit set in Section 56 of Decree No. 307/2002 Coll. (200 μSv for gaseous effluences for nuclear power installations).

4.2.3 SÚRAO

4.2.3.1 RAW Repository Richard

The repository is used to dispose of particularly RAW containing artificial radionuclides. Separately from the disposed RAW there are also RAW, which cannot be currently disposed and wait to be disposed in a respective repository. They are mainly spent sealed radionuclide sources, collected sources used in smoke detectors and nuclear materials.

Tab. 4.6 Inventory of RAW disposed in the Richard repository as at 31 December 2004

Radionuclide	**Total activity** [Bq]
^{3}H	$5.31 \,.\, 10^{13}$
^{14}C	$8.19 \,.\, 10^{12}$
^{36}Cl	$8.89 \,.\, 10^{9}$
^{90}Sr	$2.77 \,.\, 10^{13}$
^{99}Tc	$4.31 \,.\, 10^{7}$
^{129}I	$4.83 \,.\, 10^{6}$
^{137}Cs	$5.41 \,.\, 10^{14}$
Total activity of long-lived α radionuclides	$1.57.10^{13}$

Tab. 4.7 Inventory of radioactive wastes stored in RAW Repository Richard as at 31 December 2004

Radionuclide	**Total activity** [Bq]
^{137}Cs	$2.44 \,.\, 10^{14}$
^{60}Co	$4.01 \,.\, 10^{14}$
^{147}Pm	$1.32 \,.\, 10^{05}$
^{241}Am	$3.13 \,.\, 10^{12}$
^{239}Pu	$2.14 \,.\, 10^{12}$
^{238}Pu	$1.11 \,.\, 10^{11}$
^{238}U	$9.57 \,.\, 10^{08}$
^{226}Ra	$3.65 \,.\, 10^{08}$
^{235}U	$4.00 \,.\, 10^{05}$
Total activity of long-lived α radionuclides	$5.38 \,.\, 10^{12}$

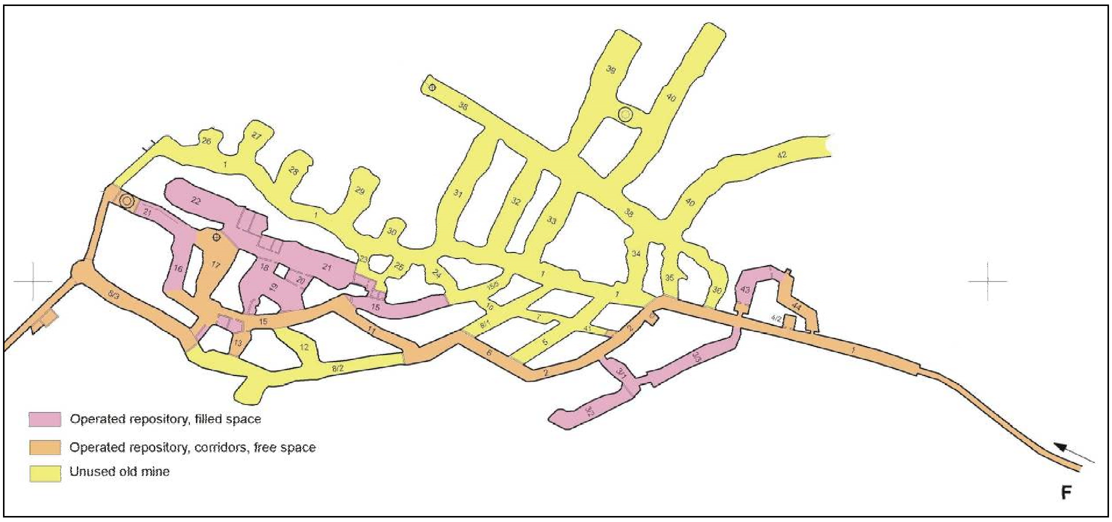

Fig. 4.6 RAW Repository Richard – cross section

4.2.3.2 Repository Bratrství

The repository is used to dispose of RAW containing natural radionuclides.

Tab. 4.8 Inventory of the repository Bratrství as at 31 December 2004

Radionuclide	Total activity [Bq]
^{226}Ra	1.262 . 10^{12} Bq
U	3.426 . 10^{11} Bq
^{232}Th	1.178 . 10^{8} Bq

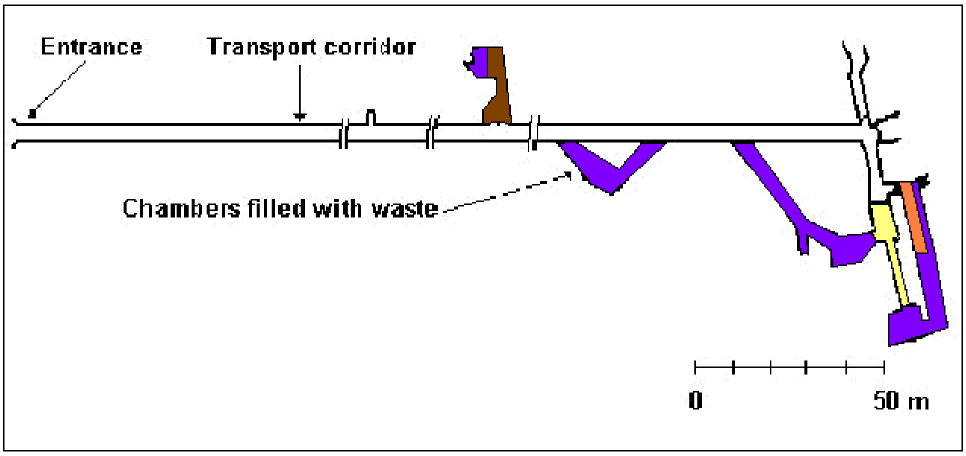

Fig. 4.7 Repository Bratrství – cross-section

4.2.3.3 RAW Repository Dukovany

The repository is used to dispose of short-lived and low-level RAW from both the nuclear power plants on the Czech Republic's territory.

Tab. 4.9 Inventory of the Dukovany repository as at 31 December 2004

Radionuclide	**Total activity** [Bq]	**Radionuclide**	**Total activity** [Bq]
^{14}C	$3.10 \cdot 10^{10}$	**^{99}Tc**	$1.23 \cdot 10^{9}$
^{41}Ca	$2.07 \cdot 10^{8}$	**^{129}I**	$5.38 \cdot 10^{8}$
^{59}Ni	$1.57 \cdot 10^{9}$	**^{137}Cs**	$5.02 \cdot 10^{11}$
^{63}Ni	$7.35 \cdot 10^{10}$	**^{239}Pu**	$2.88 \cdot 10^{6}$
^{90}Sr	$3.02 \cdot 10^{9}$	**^{241}Am**	$1.51 \cdot 10^{8}$
^{94}Nb	$9.17 \cdot 10^{8}$		

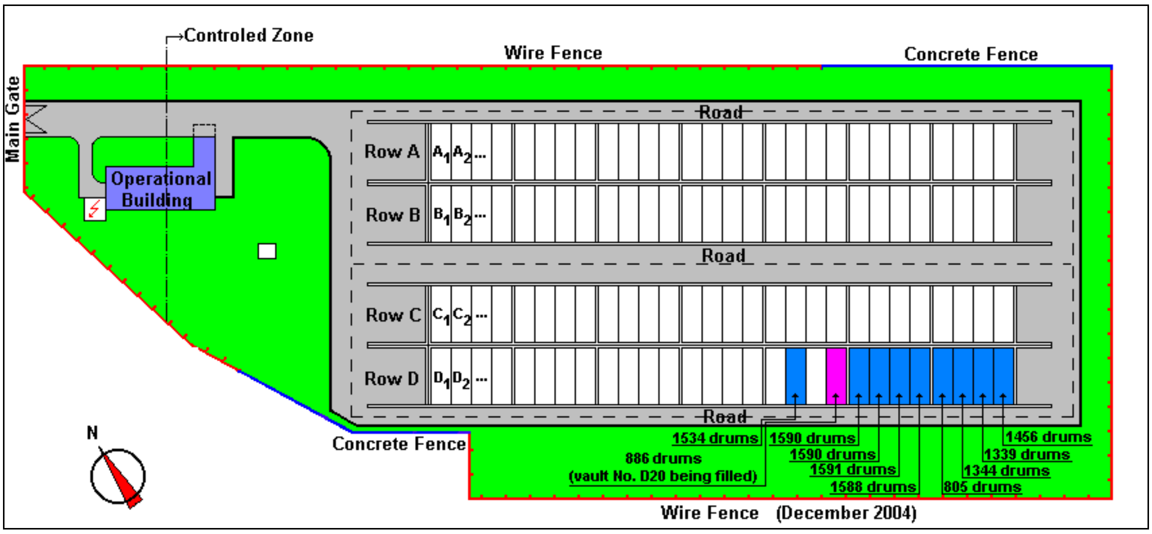

Fig. 4.8 Ground plan and current filling status in the tanks in RAW Repository Dukovany as at 31 December 2004

4.2.3.4 RAW Repository Hostím

The repository was used to dispose RAW of institutional origin and has been closed. Based on a conservative evaluation of documents and radiation monitoring the activity of its inventory was calculated as in 1991, which is provided in tab. 4.10.

Tab. 4.10 Inventory of the Hostím repository – activity recalculated as in 1991

Radionuclide	Total activity [Bq]	
	gallery A	**Gallery B**
^{3}H	Estimate: equivalent of gallery A, max. 10^{10} Bq (the range of radionuclides produced in the then ÚJF)	$1.0 \, . \, 10^{11}$
^{14}C		$2.0 \, . \, 10^{10}$
^{137}Cs		$1.3 \, . \, 10^{10}$
^{90}Sr		$1.3 \, . \, 10^{10}$
^{60}Co		$5.8 \, . \, 10^{8}$
^{226}Ra		$3.3 \, . \, 10^{7}$
^{63}Ni		$1.9 \, . \, 10^{6}$
^{204}Tl		$1.5 \, . \, 10^{6}$
^{147}Pm		$1.1 \, . \, 10^{5}$
Total activity of long-lived α radionuclides *)	max. 10^{10}	ca. 10^{11}
Total activity of short-lived α radionuclides **)	< 10^{11}	

*) recalculated as in 1997
**) recalculated as in 2002

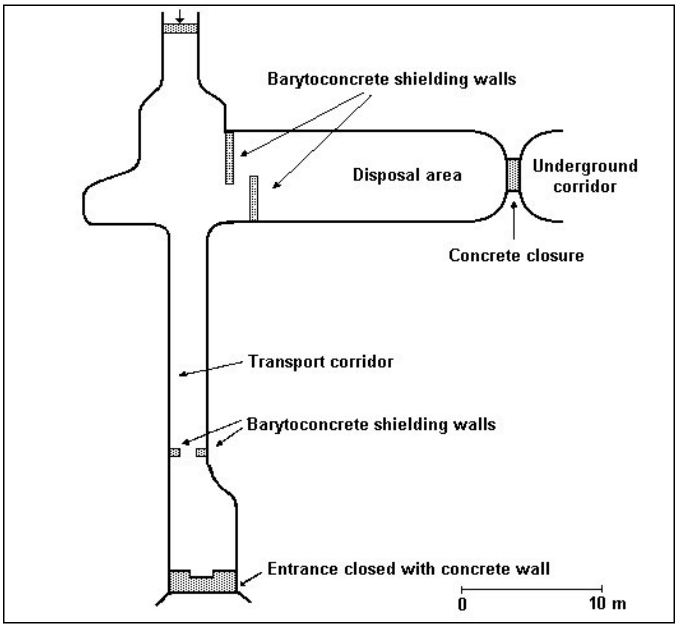

Fig. 4.9 RAW Repository Hostím – cross section

4.2.4 ÚJV Řež a. s.

4.2.4.1 Building 241 – Velké zbytky - RAW Management Facility

The facility is used to store RAW before treatment and RAW after conditioning before the transport for disposal.

Tab. 4.11 Quantities of low- and intermediate-level RAW before processing

Volume of liquid RAW [m^3]	**Volume of solid RAW** [m^3]
163	23

Tab. 4.12 Quantities of conditioned low- and intermediate-level RAW

Maximum volume of RAW [m^3]
26

Tab. 4.13 Quantities of low- and intermediate-level solid RAW stored in Building 211/6

Box No.	**Volume of RAW** [m^3]
box No. 1	140
box No. 2	140
box No. 3	100
box No. 4	140
box No. 7	20
box No. 8	50
Total	**590**

The estimated total activity of the stored RAW is: 100 GBq (RAW) and 3 TBq (disused sealed sources), with the prevailing radionuclides ^{60}Co, ^{90}Sr, ^{137}Cs.

4.2.4.2 Building 211/8 – HLW Storage Facility

Tab. 4.14 Quantity of low-and intermediate-level RAW

Box No.	**Volume of RAW** [m^3]
box No. I	0.02
box No. II	2.4
box No. IV	2.8
Total	**5.22**

The estimated total activity of the stored RAW is 1,87 MBq (isotopes $^{235,\ 238}$U), 30.29 GBq (^{239}Pu), 7.7 TBq (activation products, particularly ^{60}Co).

Tab. 4.15 List of the stored SF

SF	No. [pcs.]	Placement	Estimated activity	Prevailing radionuclides
IRT–2M (80 % wt. ^{235}U)	240	Pool B	2872 TBq	U isotopes, fission products, actinides
EK–10 (10 % wt. ^{235}U)	16	Pool B	80 TBq	
EK–10 (10 % wt. ^{235}U)	190	Concrete OS	950 TBq	

4.2.4.3 Storage Area for RAW Červená skála

Tab. 4.16 Quantities of low- and intermediate-level RAW

Placement	Number [pieces]	Volume of RAW [m^3]
ISO containers	6	120
Collecting tanks in building 261	2	20
Sand filter tanks in building 241	5	20
Collecting tanks 9A, 9B, 9C in building 241	3	30
Exchangers in building 241	2	4
Tanks B a C in building 241	2	4
Total	**20**	**198**

The estimated activity of the stored RAW is 10 GBq, with the prevailing radionuclides ^{60}Co, ^{90}Sr, ^{137}Cs.

4.2.4.4 Decay Tank for RAW, Building 211/5

Tab. 4.17 Quantities of RAW stored in decay tanks

Placement	Volume of RAW [m^3]	
	Liquid RAW	**Solid RAW**
Pool A	4.5	0
Pool B	8	3
Total	**12.5**	**3**

The estimated activity of the stored RAW in decay tanks, building 211/5 is 50,2 TBq.
The prevailing radionuclides are ^{60}Co, fission products (particularly ^{90}Sr, ^{137}Cs).

5. Legislative and Regulatory System – Articles 18 - 20 of the Joint Convention

5.1 Implementing Measures

Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory and administrative measures and other steps necessary for implementing its obligations under this Convention.

A summary of all steps leading to fulfillment of the Convention in terms of legislative, supervisory and administrative activities is described particularly in Articles 19, 20 and in detail in the individual articles of the National Report.

5.2 Legislative and Regulatory Framework

1. *Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management.*
2. *This legislative and regulatory framework shall provide for:*
   (i) the establishment of applicable national safety requirements and regulations for radiation safety;
   (ii) a system of licensing of spent fuel and radioactive waste management activities;
   (iii) a system of prohibition of the operation of a spent fuel or radioactive waste management facility without a license;
   (iv) a system of appropriate institutional control, regulatory inspection and documentation and reporting;
   (v) the enforcement of applicable regulations and of the terms of the licenses;
   (vi) a clear allocation of responsibilities of the bodies involved in the different steps of spent fuel and of radioactive waste management.
3. *When considering whether to regulate radioactive materials as radioactive waste, Contracting Parties shall take due account of the objectives of this Convention.*

5.2.1 Currently Valid Legislation in Utilization of Nuclear Energy and Ionizing Radiation

The history of the development Czech legislation in nuclear safety and radiation protection is described in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1 of February 2003. This section deals only with the currently effective legislation.

The Act No. 18/1997 Coll. as amended later (Atomic Act) defines conditions for peaceful utilization of nuclear energy and ionizing radiation, including activities requiring a license from SÚJB. The Atomic Act is followed-up by the following decrees:

- SÚJB Decree No. 144/1997 Coll., on physical protection of nuclear materials and nuclear installations and their classification,

- SÚJB Decree No. 145/1997 Coll., on accounting for and control of nuclear materials and their detailed specification, as amended by Decree No. 316/2002 Coll.,
- SÚJB Decree No. 146/1997 Coll., specifying activities directly affecting nuclear safety and activities especially important from radiation protection viewpoint, on requirements for qualification and professional training, on methods for verification of special professional competence and issue of authorizations to selected personnel, and the form of documentation to be approved for licensing of training of selected personnel, as amended by Decree No. 315/2002 Coll.,
- SÚJB Decree No. 179/2002 Coll., establishing a list of selected items and items of dual use in the nuclear area,
- SÚJB Decree No. 307/2002 Coll., on radiation protection,
- SÚJB Decree No. 214/1997 Coll., on quality assurance in activities associated with nuclear energy use and radiation practices and on establishing criteria for classification and categorization of classified equipment into safety classes,
- SÚJB Decree No. 215/1997 Coll., on criteria for siting of nuclear installations and very significant sources of ionizing radiation,
- SÚJB Decree No. 318/2002 Coll., on details for assurance of emergency preparedness at nuclear installations and workplaces with sources of ionizing radiation and on requirements for the content of on-site emergency plans and of emergency rules, as amended by Decree No. 2/2004 Coll.,
- SÚJB Decree No. 106/1998 Coll., on nuclear safety assurance of nuclear installations during their commissioning and operation,
- Decree SÚJB No. 195/1999 Coll., on requirements for nuclear installations to assure nuclear safety, radiation protection and emergency preparedness,
- Decrees SÚJB No. 185/2003 Coll., on decommissioning of nuclear installations and workplaces in categories III and IV,
- Decree SÚJB No. 324/1999 Coll., establishing concentration and quantity limits of nuclear materials not subject to provisions about nuclear damages.
- Decree No. 317/2002 Coll., on type-approval of packagings for transport, storage and disposal of nuclear materials and radioactive substances, on type-approval of ionizing radiation sources and transport of nuclear materials and specified radioactive substances
- Decree No. 319/2002 Coll., on function and organization of the national radiation monitoring network,
- Decree No. 419/2002 Coll., on personal radiation passes.
- Decree No. 107/2003 Coll. by the Ministry of Finance, on involvement of regional offices in allocation of subsidies to identify risks resulting from presence of radon and its daughter isotopes in the interior atmosphere of buildings and in water used for public supply and in adoption of related measures,
- Decree No. 360/2002 Coll., by MPO, establishing a method to create a provision for decommissioning of nuclear installations and workplaces in categories III or IV,
- Government Order No. 46/2005 Coll., to alter the Government Order No. 416/2002 Coll., establishing amounts of allocations and method of their payment by generators RAW to the nuclear account and amounts of annual contributions to municipalities and rules for their provision,
- Government Order No. 11/1999 Coll., on emergency planning zone.

The requirements for RAW management (RAW from nuclear installations and institutional RAW) are defined in the Atomic Act (Sections 24-31) and in Decree No. 307/2002 Coll. (Sections 46-55).

The adoption of the so-called "crisis legislation" represented a major step in the legislative efforts. It includes the following acts, government orders and decrees:

- Act No. 239/2000 Coll., on the Integrated Rescue System and alterations in some acts,
- Act No. 240/2000 Coll., on crisis management and alterations in some acts (Crisis Act),
- Act No. 241/2000 Coll., on economic measures for crisis conditions and alterations in some acts.
- Constitutional Act No. 110/1998 Coll., on Czech Republic safety, as amended by Act No. 300/2000 Coll.,
- Act No. 353/1999 Coll., on prevention of serious accidents caused by selected dangerous chemical materials and chemical preparations and on alteration of Act No. 425/1990 Coll., as amended later
- Government Order No. 246/1998 Coll., defining lists of confidential facts, as amended later.
- Act No. 148/1998 Coll., on protection of confidential facts and alterations in some acts, as amended later.
- Decree No. 328/2001 Coll., on some details of integrated rescue system assurance, as amended by Decree No. 429/2003 Coll.

These legal rules govern one of the areas directly associated with nuclear safety in a manner compatible with the EU law.

In connection with the country's preparation to join the EU and in order to enable implementation of obligations resulting from the newly concluded international treaties, the Parliament of the Czech Republic has amended the Atomic Act with Act No. 13/2002 Coll. The changes concern mainly the provisions dealing with radiation protection in order to ensure compatibility with applicable European directives and the provisions dealing with guarantees, which accept Additional Protocol to the Nuclear Weapons Non-proliferation Treaty.

A complete list of legal regulations concerning nuclear energy, ionizing radiation and related regulations is provided in Chapter 12.6. Full texts of the Atomic Act and its implementing regulations are available on the SÚJB website (http://www.sujb.cz).

The Czech legislation in the given area includes by means of reference in the Atomic Act and other regulations also the following international treaties acceded by the Czech Republic (or by the former ČSSR and later ČSFR):

- Treaty on timely announcing of nuclear accidents,
- Treaty on assistance in case of a nuclear or radiation accident,
- Nuclear weapons non-proliferation treaty,
- Agreement between the Czech Republic and the IAEA for the Application of Safeguards in connection with the Treaty on the Non-Proliferation of the Nuclear Weapons,
- Convention on physical protection of nuclear materials,
- Vienna Convention on civil liability for nuclear damage,
- Joint Protocol relating to the application of the Vienna and Paris Conventions,
- Convention on nuclear safety,
- Joint Convention on the safety of spent fuel management and on the safety of radioactive waste management,

- Additional Protocol to the Agreement between the Czech Republic and the IAEA for the Application of Safeguards in connection with the Treaty on the Non-Proliferation of the Nuclear Weapons,
- Modified supplementary agreement on technical assistance provided by the International Atomic Energy Agency to the Government of ČSFR,
- Agreement on formation of Korea Energy Development Organization (KEDO),
- Protocol on amendment to the Vienna Convention on civil liability for nuclear damage,
- Convention on additional indemnification of nuclear damages.

Apart from the already mentioned international documents, the Czech Republic has also signed the Comprehensive Nuclear Test Ban Treaty which, however, has not come into effect yet. The Czech Republic is also a pro-active member of IRS, INES and ENATOM within the IAEA systems.

The duty to inform about significant events affecting nuclear safety is also established in the following bilateral agreements entered by the Czech Republic or its predecessors:

- Agreement between Government of the Czechoslovak Socialist Republic and Government of the Republic of Austria on regulation of the issues of mutual interest related to nuclear safety and radiation protection,
- Agreement between Government of the Czech and Slovak Federative Republic and Government of the Federal Republic of Germany on regulation of the issues of mutual interest related to nuclear safety and radiation protection,
- Agreement between Government of the Czech and Slovak Federative Republic and Government of the Hungarian Republic on sharing of information and cooperation nuclear safety and radiation protection,
- Agreement between Government of the Czech Republic and Government of the Slovak Republic on cooperation and state supervision of and nuclear safety of nuclear installations state supervision of nuclear materials.

The legislative framework has been complemented with a number of recommendations and guidelines issued since 1978 by the state nuclear safety supervisory body in a special non-periodic publishing series „Nuclear Installations Safety – Requirements and Guidelines“.

5.2.2 Approval Process, Inspections and Enforcement of Compliance

The basic legal regulations governing the licensing and approval process for nuclear installations are the above-mentioned Construction Act (No. 50/1976 Coll.) and Atomic Act. Other important regulations in this area include Act No. 71/1967 Coll., on administrative procedure, Act No. 552/1991 Coll., on state inspection, Act No. 244/1992 Coll., on assessment of impacts of development concepts and programs on the environment, Act No. 100/2001 Coll., on assessment of impacts on the environment and Act No. 106/1999 Coll., on free access to information, as well as other related lower legal regulations.

From the viewpoint of the Construction Act, there are four fundamental licenses for any construction with a nuclear installation, i.e. sitting licence, construction licence, operation license and decommissioning licence, within the competence of local authorities, specifically the locally relevant construction department. Provided the proceedings involve interests protected by special regulations, such as nuclear safety or radiation protection, the building department shall decide in agreement with or based on an permit from relevant state administration bodies which defend such interests. The relevant state administration body may make its permit conditional upon meeting of conditions specified in its decision issued in agreement with a special act that authorizes the body to do so. The bodies include in particular:

- technical inspection bodies in respect to conventional safety, including safety of pressure components and electric systems,
- local competent authorities
  - in respect to fire safety,
  - in respect to waste management,
  - in respect to water consumption and discharge of wastewater,
- Czech Environmental Inspection from the viewpoint of air pollution,
- Locally competent public health authority from the viewpoint of safety and health protection at work under Act No. 258/2000 Coll., on public health protection, as enacted later.

In Section 126 paragraph 3 the Construction Act establishes expressly that a construction department, before issuing a sitting licence, construction licence, operation license or any other additional permit concerning a construction which includes a nuclear installation, shall request the applicant to submit a permit issued by SÚJB under the Atomic Act. Pursuant to the Construction Act the construction department shall not issue any license without this permit.

The Atomic Act specifies activities requiring a license from SÚJB. Apart from the zoning and planning decision, building permit and approval to operate, many other activities require the approval e.g. individual stages of nuclear installation commissioning, refurbishment or other changes affecting nuclear safety, radiation protection, physical protection and emergency preparedness, discharge of radionuclides into the environment etc. More detailed information is provided in the respective chapters hereof.

Act No. 17/1992 Coll., on the environment, as amended and supplemented later, Act No. 244/1992 Coll., on assessment of impacts of development concepts and programs on the environment and, particularly, Act No. 100/2001 Coll., on assessment of impacts on the environment and alterations in some related acts (Act on Assessment of Impacts on the Environment), require assessment of construction projects from the viewpoint of their impact on the environment (the so-called „Environmental Impact Assessment“) in a special procedure with a potential involvement of the public. The act establishes a right for the public – citizens- to attend related public hearings and to express their comments on the concerned construction. The public may be also represented by a concerned municipality, which is a party to the proceedings under the law, or by registered civil initiatives. The state administration body in charge of a decision about the impact of a nuclear power plant construction on the environment is the Ministry of the Environment.

SÚJB supervising activities are in detail defined by Section 39 of the Atomic Act and also by No. 552/1991 Coll., on state inspection, as amended later.

Remedial measures to meet legislative requirements are specified in Sections 40 and 41 of the Atomic Act and include the SÚJB power to require redress, to order performance of technical reviews, inspections and tests of operational condition of the installation, power to withdraw an authorization of special professional competence from the nuclear installation personnel in case they violate their obligations and power to impose fines for failure to met the obligations specified in the Atomic Act.

In case of danger in delay SÚJB shall be entitled to order to reduce the output of or stop operation of a nuclear installation. Section 16 of the Atomic Act, and particularly its paragraph 4, deals with alteration, cancellation and cessation of a license, which entitles SÚJB to reduce or suspend the licensed activity, provided the licensee violates his obligations.

5.3 Regulatory Bodies

1. *Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 19, and provided with adequate authority, competence and financial and human resources to fulfill its assigned responsibilities.*
2. *Each Contracting Party, in accordance with its legislative and regulatory framework, shall take the appropriate steps to ensure the effective independence of the regulatory functions from other functions where organizations are involved in both spent fuel or radioactive waste management and in their regulation.*

5.3.1 Mandate and Competence of the Regulatory Body

At the moment the competence of SÚJB is defined by the Atomic Act, Section 3 that states the following:

“ *(1) State administration and supervision of the utilization of nuclear energy and ionizing radiation and in the field of radiation protection shall be performed by the State Office for Nuclear Safety (hereafter referred to as "the Office").*

(2) The Office

a) shall carry out state supervision of nuclear safety, nuclear items, physical protection, radiation protection and emergency preparedness and shall inspect the adherence to the fulfillment of the obligations arising out of this Act;

b) shall monitor non-proliferation of nuclear weapons and carry out state supervision of nuclear items and physical protection of nuclear materials and nuclear installations;

c) shall issue licenses to perform practices governed by this Act and shall issue type-approvals for packaging assemblies for transport and storage of nuclear materials and radioactive substances given in an implementing legal regulation, ionizing radiation sources and other products;

d) shall issue authorizations for activities performed by selected personnel;

e) shall approve documentation, programs, lists, limits, conditions, methods of physical protection assurance, emergency rules and, subject to discussion with the relevant District Authority of compatibility with off-site emergency plans, on-site emergency plans and their modifications;

f) shall establish conditions, requirements, limits, maximum permitted levels, maximum permitted levels of radioactive contamination of foodstuffs, guidance levels, dose constraint, reference levels, diagnostic reference levels, exemption levels and clearance levels;

g) shall establish the emergency planning zone and, if applicable, its further structuring, and shall approve delineation of the controlled area;

h) in accordance with an implementing legal regulation, shall establish requirements on emergency preparedness of licensees, and shall inspect their fulfillment;
i) shall monitor and assess the exposure status and regulate exposure of individuals;
j) shall issue, register and verify personal radiation passport; related details shall be set out in an implementing legal regulation;
k) shall provide information to municipalities and District Authorities concerning radioactive waste management within their territory of administration;
l) shall control the activity of the National Radiation Monitoring Network, the functions and organization of which shall be set out in an implementing legal regulation, shall provide for the functioning of its head-office, and shall provide for the activities of an Emergency Response Center and for an international exchange of information on the radiation situation;
m) shall establish State and Professional examination commissions for verification of special professional competence of selected personnel, and shall issue statutes for these commissions and specify activities directly affecting nuclear safety and activities especially important from the radiation protection viewpoint;
n) shall maintain a State system of accounting for and control of nuclear materials and data and information in accordance with international agreements binding on the Czech Republic, and shall set out requirements for accounting methods and inspection thereof in an implementing legal regulation;
o) shall maintain a national system for registration of licensees, registrants, imported and exported selected items, ionizing radiation sources, and a record of exposure of individuals;
p) shall ensure, by means of the National Radiation Monitoring Network and based on assessment of a radiation situation, the availability of background information necessary to take decisions aimed at reducing or averting exposure in the case of a radiation accident;
q) shall approve a classification of nuclear installation or its components and nuclear materials into appropriate categories, from the physical protection viewpoint;
r) shall perform the function of the national authority for an international verification of a comprehensive ban of nuclear tests;
s) shall ensure international co-operation within its sphere of competence and, in particular, shall be an intermediary of technical co-operation with the International Atomic Energy Agency, and within its sphere of competence shall communicate information to the European Commission or, if applicable, to other bodies of the European Union;
t) shall decide on assurance of handling nuclear items, ionizing radiation sources or radioactive wastes having been treated inconsistently with rules of law, or where the detrimental condition is not being removed;
u) shall be obliged to give out information according to special legal provisions and once a year to publish a report on its activities and submit it to the Government and to the public.“

The competence of SÚJB has been further extended by Act No. 249/2000 Coll., on execution of state administration and inspection of chemical weapons ban and by Act No. 281/2002 Coll., on some measures associated with the ban on bacteriological (biological) and toxin weapons. As a result, the independent supervision has been concentrated in one central agency, which has enabled to improve efficiency of the supervisory activities.

5.3.2 Specification of Powers and Responsibilities of the Regulatory Body

Section 9 paragraph 1 of the Atomic Act establishes the following conditions for utilization of nuclear energy and ionizing radiation:

"A license issued by the Office is required for:

a) siting of a nuclear installation or radioactive waste repository,
b) construction of a nuclear installation or category IV workplace,
c) particular stages, laid down in an implementing legal regulation, of nuclear installation commissioning,
d) operation of a nuclear installation or category III or IV workplace,
e) restart of a nuclear reactor to criticality following a fuel reload,
f) reconstruction or other changes affecting nuclear safety, radiation protection, physical protection and emergency preparedness of a nuclear installation or category III or IV workplace,
g) particular stages of decommissioning of a nuclear installation or category III or IV workplace to the extent and in the manner established in an implementing legal regulation;
h) discharge of radionuclides into the environment to the extent and in the manner established in an implementing legal regulation;
i) ionizing radiation sources management to the extent and in the manner established in an implementing regulation;
j) radioactive waste management to the extent and in the manner established in an implementing legal regulation;
k) import or export of nuclear items or transit of nuclear materials and selected items;
l) nuclear materials management;
m) transport of nuclear materials and radioactive substances laid down in an implementing legal regulation; this license does not relate to the person performing the transport, or to the carrier, unless he is simultaneously the shipper, or consignor or consignee;
n) professional training of selected personnel (Section 18 para 5);
o) re-import of radioactive waste originated in the processing of materials exported from the Czech Republic;
p) international transport of radioactive wastes to the extent and in the manner established in an implementing regulation;
q) performance of personal dosimetry and other services significant from the viewpoint of radiation protection to the extent and in the manner established in an implementing regulation;
r) adding of radioactive substances into consumer products during their manufacturing or preparation or import or export of such products."

Other provisions of the Atomic Act define:

- conditions of the license issue (Section 10),
- probity and professional competence of the applicant for a license (Sections 11 and 12),

- content and particulars of the license application (Section 13),
- SÚJB conduct in the administrative proceedings (Section 14),
- requisites of the license (Section 15),
- alteration, cancellation and cessation of the license (Section 16).

The execution of state supervision of peaceful utilization of nuclear energy and ionizing radiation, including sanctions, is regulated in the Atomic Act, Chapter VI, covering:

- SÚJB supervising activities (Section 39),
- remedial measures (Section 40),
- penalties (Sections 41 and 42).

The Atomic Act, together with Act No. 552/1991 Coll., on state inspection and monitoring, provide SÚJB with sufficient powers to execute the state supervision and also means of coercion to enforce fulfillment of legal requirements for nuclear safety and radiation protection.

SÚJB performs supervision of compliance with the Atomic Act and other regulations issued based on the Act by the licensees under the quoted Section 9 paragraph 1. SÚJB supervisory activities are in detail described in Section 39 paragraph 1 of the Atomic Act.

SÚJB personnel performing the supervision are nuclear safety and radiation protection inspectors appointed by SÚJB Chairperson. They work at the SÚJB headquarters, at the power plants in Dukovany and Temelín and in the regional centers. Within the supervisory activities the inspectors and SÚJB Chairperson are entitled particularly:

- to enter at any time the supervised buildings, facilities, operations, land and other premises associated with the utilization of nuclear energy or radiation practices,
- to inspect observation of requirements for and conditions of nuclear safety, radiation protection, physical protection and emergency preparedness and condition of the nuclear installation, in compliance with limits and conditions and operating procedures,
- to require evidence of meeting of all specified obligations in assurance of nuclear safety, radiation protection, physical protection and emergency preparedness of the nuclear installation, to perform measurements and collect samples from inspected persons as necessary to inspect compliance with the Act and other regulations based on the Act.,
- to verify professional competence and special professional competence under the said Act,
- to participate in investigation and in liquidation of events important from the viewpoint of nuclear safety, radiation protection, physical protection and emergency preparedness, including unauthorized handling of nuclear items or ionizing radiation sources.

Should an inspector identify deficiencies in activities performed by the inspected person, he shall be authorized, depending on the nature of the identified shortcoming, to:

- require the inspected person to remedy the situation within the a set period of time,
- order to the inspected person to perform technical inspections, reviews or tests of functional capability of the installation, its parts, systems or its assemblies, provided it is necessary for verification of nuclear safety,
- withdraw the special professional competence authorization issued to an employee of the inspected person, in the event of serious violation of his obligations or his failure to meet requirements for professional competence or physical and mental capability,

- propose that a penalty is imposed.

If there is a danger in delay or in case of undesirable situations important from the viewpoint of nuclear safety, radiation protection, physical protection and emergency preparedness, SÚJB shall be authorized to issue a provisional measure imposing on the inspected person the obligation to reduce the power output or suspend operation of the nuclear installation, suspend assembling of components or systems of a nuclear installation, to prohibit handling of nuclear items, ionizing radiation sources or RAW, or to impose on the inspected person the obligation to tolerate that the handling is performed by another person at the expense of the inspected person.

For violation of a legal obligation established in the Atomic Act SÚJB may impose a penalty up to the amount specified in Section 41 and in compliance with the rules specified in Section 42.

The binding procedures for supervising activities are set forth in the SÚJB internal documents.

5.3.3 Position of the Regulatory Body within the State Administration Structure

The SÚJB, as a succession body of ČSKAE, is an independent central state administration body for the area of nuclear safety and radiation protection. It has its own budget item approved by the Parliament of the Czech Republic within the state budget. A Chairperson appointed by the Czech Government heads the SÚJB. The SÚJB position within the state administration structure is shown in Fig. 5.1.

5.3.4 Regulatory Body Structure, Technical Support and Material and Human Resources

The number of positions approved in the SÚJB budget for 2005 is 194, while approximately 2/3 of the number are nuclear safety and radiation protection inspectors. The SÚJB budget for 2005 is approximately CZK 371 million (1 € ≈ 30 CZK). Given the current conditions in the Czech Republic, the material and human resources are sufficient to fulfill the basic functions required from SÚJB under the law.

The SÚJB organizational structure is shown in Fig. 5.2 and consists of:

- Section of nuclear safety which includes Department of nuclear installations assessment, Department of nuclear installations' inspections and Department of RAW and SF management,
- Section of radiation protection which includes Department of exposure regulation, Department of radiation sources and Department of radiation protection in fuel cycle and Division of assessment of radiation protection activities,
- Section of management and technical support which includes the Office bureau (personnel training, science and research coordination etc.), Department of international cooperation, Department of financial management and administration, Department for control of ban of chemical and biological weapons, Department of nuclear non-proliferation and Legal division,
- independent department of emergency preparedness and crisis management - Emergency crisis center (reporting directly to the SÚJB Chairman)
- other departments reporting directly to the SÚJB Chairman (internal audit, secretariat, Euro unit),
- advisory bodies to the Office Chairperson,

- regional SÚJB centers in Prague, Plzeň, České Budějovice, Ústí nad Labem, Hradec Králové, Příbram-Kamenná Brno and Ostrava, subordinated to the radiation protection section,
- detached workplaces of the nuclear safety section at both the nuclear power plants (Dukovany, Temelín)

SÚJB is also a managing authority for SÚRO, fully funded from the state budget, which provides professional and technical support in radiation protection and for SÚJCHBO, partly funded from the state budget, which provides primary professional and technical support to SÚJB in chemical, biological and radiation protection. Additional professional support to SÚJB is provided by other research institutes (e.g. ÚJV Řež a. s.) and universities on contractual basis.

Responsibilities within the SÚJB organizational structure are defined by the Organization Manual and other internal management documents.

Early in 1998 SÚJB Chairperson established advisory teams of independent experts, separately for nuclear safety and radiation protection. Although law does not regulate activities of the teams they are important advisory bodies for major issues dealt with by SÚJB in nuclear safety and radiation protection.

5.3.5 Regulatory Body within the Structure of Governmental Bodies

As indicated by the above-mentioned Czech legislation and state administration structure, SÚJB has all powers necessary to perform its mission – to carry out the state supervision of nuclear safety, radiation protection, physical protection and emergency preparedness. Meanwhile, the SÚJB competencies neither overlap with nor are in contradiction to other state administration bodies.

5.3.6 Independent Evaluations of the State Supervision

After the changes in the supervisory and legal framework performed in the second half of the 1990s and after their full implementation the Czech Republic approached IAEA to request independent evaluation of the efforts. This was done in form of two international IRRT missions of experts who visited SÚJB in March 2000 and June 2001.

According to the results presented by the experts in their final report from the mission, they found both the legislative framework and performance of the state supervision of peaceful utilization of nuclear energy and ionizing radiation at a very good level corresponding to the good worldwide practices. In respect to the position of the regulatory body within the state administration structure, the experts highlighted the fact that SÚJB has reached independence not only „de jure“ but also „de facto“. The experts also worded specific recommendations whose implementation may further improve the level of supervision in the Czech Republic. The recommendation focused e.g. on special fields of supervision such as practicing of emergency preparedness or further development of use of probabilistic methods in nuclear safety evaluation. However, they positively stated that those recommendations mostly concerned long-lived development of the organization. Reports from both the IRRT missions have been published on the SÚJB website.

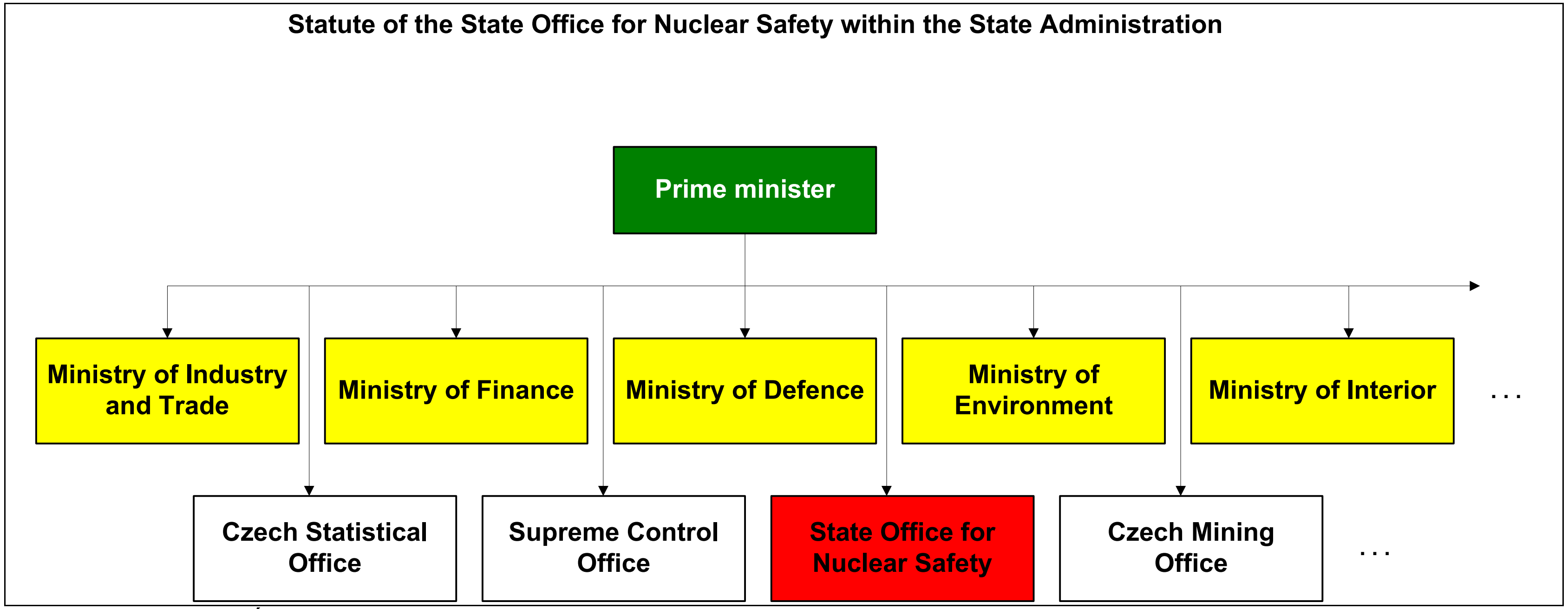

Fig. 5.1 Position of SÚJB within the state administration structure

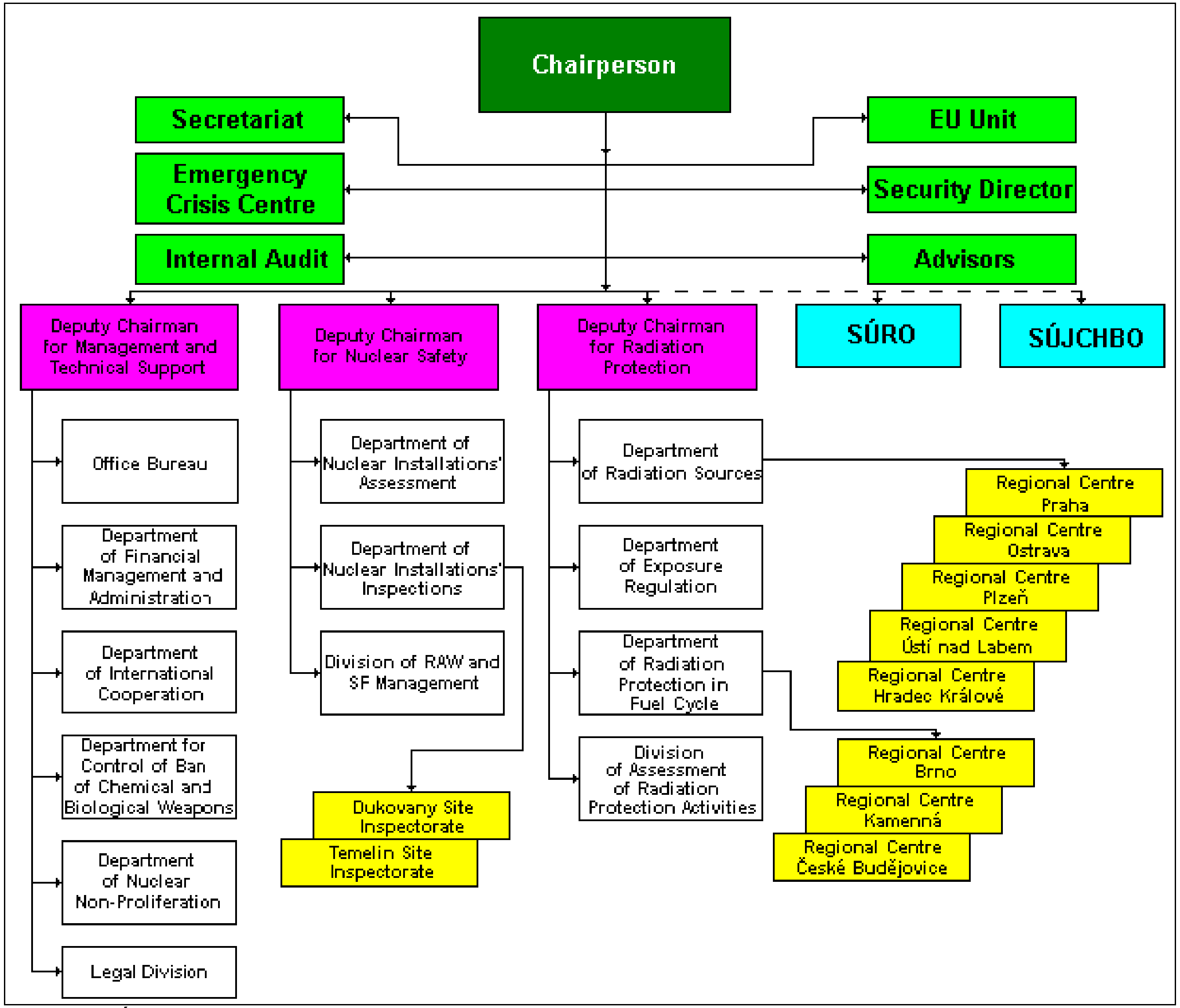

Fig. 5.2 SÚJB Structure

6. Other Generic Safety Provisions – Joint Convention, Articles 21 - 26

6.1 Responsibility of the Licensee

1. Each Contracting Party shall ensure that prime responsibility for the safety of spent fuel or radioactive waste management rests with the holder of the relevant license and shall take the appropriate steps to ensure that each such licensee meets its responsibility.

2. If there is no such licensee or other responsible party, the responsibility rests with the Contracting Party which has jurisdiction over the spent fuel or over the radioactive waste.

The licensee's responsibility for safe management of SF and RAW is defined in the Atomic Act which specifies a number of partial responsibilities of the licensee that would constitute the aggregate liability for nuclear safety. Those specific responsibilities are mainly discussed under Sections 17 and 18 of the Atomic Act where the licensee is required, among other things, to ensure nuclear safety, radiation protection, physical protection and emergency preparedness of its respective nuclear installation followed by additional requirements for the nuclear safety assurance system as imposed on the part of the licensee, e.g.

- review and maintain systematically the nuclear safety and radiation protection to keep it up with the latest developments in science and technology;
- observe the technical or organizational terms of safe operation, license terms and conditions, and the approved quality assurance programs;
- investigate promptly any breach of these terms and conditions and adopt corrective actions to prevent recurrence of such events;
- report promptly occurrence of any events important for nuclear safety.

The state supervisor of nuclear safety is mainly responsible to exercise supervision over performance and fulfillment of the above requirements. The rights of the nuclear safety or radiation protection inspectors are specified under Section 39 para 4, letters b), and c) of the Atomic Act. In compliance with this law, the inspectors shall be entitled to inspect observance of the terms and requirements for nuclear safety, radiation protection, physical protection, and emergency preparedness, as well as the condition of nuclear equipment, or adherence to technical specifications and operating procedures and to demand evidence that the specified obligations have been fulfilled.

The joint-stock company ČEZ, a. s. as the holder of license for operation of NPP Dukovany and NPP Temelín, SÚRAO and ÚJV Řež a. s., holds the primary responsibility for nuclear safety and radiation protection of their nuclear installations and repositories. This responsibility is delegated at the executive level to the respective managers where directors of those organizations play the key role in terms of safety. It shall be the highest priority of the Licensee to ensure nuclear safety, radiation protection and emergency preparedness. The entire management system shall be used to maintain the desired level of safety, including the necessary safety controls and feedback to verify the level of safety.

The Licensee has implemented its own supervision system in order to follow the requirements under the Atomic Act. In compliance with the Quality Assurance Program and the elaborated obligations, or delegated responsibility within other documents, the authorized work procedures and the specified dates for periodical testing are subject to supervision. In compliance with the implemented system code, if any event occurs that is related to nuclear safety or radiation protection, this event shall be recorded and examined, and followed by corrective actions provided to prevent recurrence of such event. This entire process shall be evaluated and monitored regularly and systematically by the state inspectors.

The major responsibilities of the Licensee also include the sole and absolute liability for nuclear damage due to operation of the nuclear installation (see Section 33, paragraph 1 of the Atomic Act).

6.2 Human and Financial Resources

Each Contracting Party shall take the appropriate steps to ensure that:

(i) qualified staff are available as needed for safety-related activities during the operating lifetime of a spent fuel and a radioactive waste management facility;

(ii) adequate financial resources are available to support the safety of facilities for spent fuel and radioactive waste management during their operating lifetime and for decommissioning;

(iii) financial provision is made which will enable the appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of a disposal facility.

The wording of the Atomic Act in respect to the personnel qualification requirements set forth in Section 18 reads:

"Activities directly affecting nuclear safety may only be performed by natural persons who are physically and mentally competent, with professional competence and to whom the Office has granted an authorization for the activities in question, subject to an application by the licensee.

Only natural persons with knowledge of the principles and procedures of radiation protection, as verified by the Expert Examination Commission of the Office, and holding an authorization to perform the working activity in question granted by the Office may perform activities especially important from the radiation protection viewpoint specified by an implementing legal regulation."

Activities with direct impact on nuclear safety and activities especially important for radiation protection, requirements for technical training and qualification, including their testing method, as well as granting of permits to persons authorized to perform the above listed activities, are specified under the implementing regulation which is the Decree No. 146/1997 Coll., as amended by the Decree No. 315/2002 Coll.

Each licensee authorized to operate a NI or a Category III and IV workplace shall be obligated under Section 18, paragraph 1, letter h) of the Atomic Act *„In case an estimate of total costs of decommissioning verified by the Radioactive Waste Repository Authority (hereinafter "the Authority") exceeds 300 000 CZK, steadily make provision*[1] *for decommissioning of nuclear installation or category III or IV workplace, so that financial resources deposited on a blocked account will be available for preparation and performing of decommissioning, at the required time and in the required amount, in line with the program of decommissioning approved by the Office. Provided the estimate of total costs exceeds 1 billion CZK the licensee shall deposit financial means at the amount of this provision on a blocked account with a bank in the Czech Republic. Yields from means on the blocked account shall be income to this blocked account. The provision shall be expenditure for generating, ensuring and maintaining revenues*[1]*. Details for making provision shall be established in an implementing regulation. Financial means on the blocked account may be utilized solely for the preparation and an implementation of decommissioning and any drawing on such funds shall be approved by the Authority. The obligation to make provision for the decommissioning shall not apply to organizational units of the state*[1a]*, and state-subsidized organisation*[1b]*, public universities* [1c] *and organizational bodies and subsidized organizations established by territorial self-governing units*[1d]*."*

The decommissioning details are specified in the Decree No. 360/2002 Coll. by the Ministry of Industry and Trade which stipulates a method for creating the provision / monetary reserve for decommissioning NIs or workplaces in categories III and IV. Institutional inspections of closed repositories will be paid from the nuclear account funded, in agreement with the Atomic Act, by generators of RAW.

6.2.1 ČEZ, a. s.

The responsibility for nuclear safety and radiation protection of the NIs owned by ČEZ, a. s. rests with the statutory body of this joint-stock company (the Board of Directors) headed by the Managing Director. The Managing Director delegates responsibilities within his/her authority to the Executive Director of the power production division who reports to the Managing Director in respect to nuclear safety and radiation protection assurance of the nuclear installations within his responsibility.

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[1] Act of the Czech National Council No. 593/1992 Coll. on reserves for calculation of the income tax base, as amended later.

[1a] Section 3 of Act No. 219/2000 Coll., on the Czech Republic's property and its acting in legal relations

[1b] Act No. 218/2000 Coll., on budgetary regulations and alterations of some related acts (budgetary rules), as amended later.

[1c] Act No. 111/1998 Coll., on universities and alterations of and amendments to some other acts (Universities Act), as amended later

[1d] Act No. 250/2000 Coll., on budgetary regulations for regional budgets, as amended by Act No. 320/2001 Coll.

The process of training and qualifications prescribed for the ČEZ personnel are detailed under Chapter 6 of the National Report of the Czech Republic under the Nuclear Safety Convention as provided in September 2001.

By the law, the joint-stock company of ČEZ is obligated to remit specific amounts to the nuclear account in order to create the provision for decommissioning of nuclear installations. The amount due to the nuclear account is defined under the Government Order at CZK 50 per each MWh of electricity generated from nuclear plants. A method to create the provision for decommissioning of nuclear installations is defined in a decree issued by the Ministry of the Industry and Trade.

The statutory reserve for decommissioning of NPP Dukovany as created by ČEZ, a. s. amounts to CZK 154.988 mil. per year. The provision for decommissioning of NPP Temelín amounts to CZK 152.864 mil. per year. The statutory reserve for decommissioning of ISFSF amounts to CZK 0.116 mil. per year.

The state organization of SÚRAO inspects and verifies that decommissioning reserves are created for NIs.

Based on an internal decision ČEZ also creates a provision for SF storage. This reserve is funded from the profit and is intended to cover the costs incurred by ČEZ from storage of SF, even upon decommissioning of nuclear units.

By the 31 December 2004, the power utility of ČEZ, a. s. provided the following amounts:

- CZK 6 005.676 mil. paid to the nuclear account;
- CZK 4 683.195 mil. available as the monetary reserve for decommission of NIs (from which the decommissioning provision for NPP Dukovany is CZK 3 884.976 mil., for NPP Temelín CZK 797.697 mil. and for ISFSF Dukovany CZK 0.522 mil.);
- CZK 6 540.180 mil. available as the internal reserve for SF storage (from which for storage of SF from NPP Dukovany CZK 5 846.222 mil. and for storage of SF from NPP Temelín CZK 693.958 mil.).

Note: In connection with the amended Atomic Act of 1 February 2002, the monetary funds corresponding to one-year provisions are deposited on blocked accounts in banks in the Czech Republic. As at 31 December 2004 the funds available on the blocked accounts amounted to CZK 1 580.503 mil. (from which CZK 992.792 mil. for NPP Dukovany and CZK 587.351 mil. for NPP Temelín and CZK 0.360 mil. for ISFSF Dukovany).

6.2.2 ÚJV Řež a. s.

The joint-stock company of ÚJV Řež a. s. shall create a monetary reserve for decommissioning of the HLW storage facility. This NI has been in operation since 1995. The projected lifetime of this facility is fifty years.

It means that the HLW storage facility would be decommissioned in 2045 where its radioactive contents are to be removed to the repository whether – if permitted by the acceptance criteria– the existing type or the underground geological facility that is being designed. If an underground repository is not available, the requirement for subsequent storage shall be addressed by construction of a new storage or reconstruction of the existing storage facility.

The waste disposal facilities are part of the decommissioning proposal approved by SÚJB. SÚRAO verified the decommissioning cost. By the 30 December 2004, ÚJV Řež a. s. created the decommissioning reserve of CZK 71 137 913 and of that the HLW storage facility provision amounts to CZK 64 500 per year.

The SF and RAW disposal are supported with a sufficient number of the qualified personnel. The number of personnel is based on an analysis of licensed activities and is sufficient to meet requirements for nuclear safety and radiation protection in the course of such activities.

6.2.3 SÚRAO

SÚRAO owns an approved proposal by SÚJB for decommissioning of repositories, and being a state owned organizational unit it shall not create any provision for decommissioning as per Section 18, paragraph 1, letter h) of the Atomic Act. The Czech Government authorizes the SÚRAO budget. The activities under the authority of SÚRAO are supported with a sufficient number of the qualified personnel. The number of personnel is based on an analysis of licensed activities and is sufficient to meet requirements for nuclear safety and radiation protection in the course of such activities.

6.3 Quality Assurance

Each Contracting Party shall take the necessary steps to ensure that appropriate quality assurance programs concerning the safety of spent fuel and radioactive waste management are established and implemented.

6.3.1 Present State

6.3.1.1 Legal Framework for Quality Assurance

The Act No. 18/1997 Coll. on peaceful utilization of nuclear energy and ionizing radiation and on amendments and alterations to some acts, as amended later (the Atomic Act) defines the general conditions for performance of practices related to nuclear energy utilization, radiation practices, and interventions to reduce exposure. The quoted Act, Section 4, paragraph 8 reads:

"Any person performing or providing for practices related to nuclear energy utilization or radiation activities, with the exception to practices as in Section 2 a) items 5 and 6, must have implemented a quality assurance system to the extent and in the manner set out in an implementing regulation, aimed at achieving the required quality of a relevant item, including tangible or intangible products, processes or organizational arrangements, with respect to the importance of this item from the aspect of nuclear safety and radiation protection. The implementing regulation shall establish the basic requirements for quality assurance of the classified equipment with respect to their safety classification."

In this case, SÚJB Decree No. 214/1997 Coll. is the implementing regulation, which established the basic requirements for quality assurance of the classified equipment and their safety classification setting out in detail:

- requirements / activities for implementation of the quality assurance system specified under the Atomic Act,
- requirements for such a quality assurance system,
- quality assurance requirements for the classified equipment with regard to their safety classification,
- requirements for the contents of quality assurance program,
- safety classification and breakdown criteria for the classified equipment,
- scope and method to prepare the list of classified equipment.

As stated in SÚJB Decree No. 214/1997 Coll., Section 2, a quality assurance system shall be implemented in the scope of requirements set forth in the quoted Decree for SF management and RAW management. The quality control system for practices licensed as per Section 9 of the Atomic Act shall be documented with quality assurance programs whose contents are specified under Section 32 of the quoted decree, and the associated quality assurance documentation, and records for any activities important for nuclear safety or radiation protection, and implemented by the licensee prior to issue of a specific license.

As per Section 13, paragraph 5 of the Atomic Act, a license granted by SÚJB for the specific activities related to nuclear energy and ionizing radiation utilization is subject to approval of the quality assurance system for the activity being licensed.

6.3.1.2 Quality Assurance Strategy of the Licensee ČEZ, a. s.

Quality assurance for the SF and RAW management is provided by ČEZ, a. s. during performance of the following nuclear activities:

- designing, implementation and operation of SF storage facilities,
- fuel cycle management,
- RAW management,
- transport of nuclear fuel and nuclear materials,
- personnel training for these activities,
- handling of ionizing radiation sources (across the company).

ČEZ, a. s. has implemented and documented a quality management system to support processes and activities in the scope of the above mentioned nuclear activities, which takes into account obligations promulgated in the corporate Quality Policy. This quality management system was designed to support processes and practices in the area of SF management and RAW management in a controlled and organized manner, in full compliance with the Atomic Act and its implementing regulations, including SÚJB Decree No. 214/1997 Coll.

The quality management system implemented for nuclear activities also meets the requirements of the Czech series of standards ČSN ISO 9000 and ČSN ISO 14000 and to the maximum extent observes IAEA recommendations issued under the Safety Series 50-C/SG Q. The quality management system requirements for nuclear activities of ČEZ, a. s. are applied using a graded approach based on the relevance of each process or item to nuclear safety and radiation protection.

The quality management system for nuclear activities has been integrated into the corporate management system.

On 1 April 2005 an organizational change was introduced in ČEZ, a. s., which merged the original nuclear energy section, as an integrated center managing nuclear activities, with fossil fuel energy section into the power production division of ČEZ, a. s. In this connection a new system of quality management documents is being developed relating to the basic activities. It has been ensured that the transition to the new system of documents is smooth and gradual and that quality assurance requirements are met at any moment in respect to nuclear safety, radiation protection, physical protection and emergency preparedness.

6.3.1.3 Quality Assurance Strategy of SÚRAO

For management of activities associated with disposal of RAW, the Ministry of Industry and Trade established the organization of SÚRAO whose activities are detailed in Chapter 4 of the Atomic Act. SÚRAO has implemented and described a quality assurance system based on the Czech standards of ČSN ISO 9000, ČSN ISO 10 000 and ČSN ISO 14 000, and following the regulatory requirements and IAEA recommendations. The quality assurance system developed and used by SÚRAO allows to:

- meet the regulatory requirements, in particular SÚJB Decree No. 214/1997 Coll. for activities provided by SÚRAO in the scope of its mission, and covered under this Decree,
- meet the requirements of standards or norms,
- follow the Policy approved by the Czech Government which proposes a long-term national strategy to be pursued in this particular field,
- provide efficient management of SÚRAO.

The quality system has been graded based on the relevance of each item or process.

The quality assurance system incorporates principles of the safety culture, which means that quality and safety issues of repositories, being nuclear installations, are given the highest priority.

Requirements under Section 21, SÚJB Decree No. 214/1997 Coll. are thoroughly applied to designing of deep repositories.

6.3.1.4 Quality Assurance Strategy of ÚJV Řež a. s.

The quality management system of ÚJV Řež a. s. is based on application of the EN ČSN ISO 9000 series of standards with the objective to assure quality of products and services for clients, as well as to follow the regulatory standards applicable to the business. The quality assurance procedures enforcing requirements for nuclear safety and radiation protection under the Act No. 18/1997 Coll. as amended are based on the corporate Quality Policy.

6.3.1.5 Quality Assurance Programs for Each Stage of Lifetime of Nuclear Installation

6.3.1.5.1 Quality Assurance Programs of ČEZ, a. s.

The quality management system of ČEZ is described in a system of management documents. These management documents include:

- strategic documents (e.g. Quality Policy, Safety Policy, etc.) – Level I,
- management documents (ČEZ rules, guidelines and procedures and orders by Managing Director or executive Director) – Level II,
- working documents (e.g. methodic instructions, operating instructions, technological procedures)- Level III.

Outputs from processes and activities (records) are also a part of the ČEZ quality system documentation.

In order to assure quality for nuclear activities, ČEZ has developed PZJ (Quality Assurance Procedures), describing the quality management system of the licensee and the affected processes and activities, including definition of responsibilities of the licensee and its contractors. In most cases PZJ use the above mentioned system of management documents to describe the quality management system.

PZJ are submitted by ČEZ to SÚJB for approval since the approval is required for a license to be issued for particular activities under Section 13 paragraph 5 of the Atomic Act.

PZJ for respective licensed activities are also used to approve refurbishment or other changes affecting nuclear safety, radiation protection, physical protection and emergency preparedness and major organizational changes in ČEZ, a. s.

PZJ for licensed activities are followed with the supplier's quality plans for components, systems, and services that may affect nuclear safety or radiation protection of nuclear installations.

6.3.1.5.2 Quality Assurance Programs of SÚRAO

The quality management system of SÚRAO is described in a system of management documents and planning documents.

The management documents are organized into 4 layers. The top layer comprises documents which set forth the quality policy and safety policy, environmental policy and quality management manual. Layer 2 includes rules and regulations, which provide general requirements associated with individual chapters of the quality management manual. Layer 3 and 4 comprise management procedures for individual activities and specific operating procedures and instructions.

The planning documents include:

- plans (long-term, 3-years, yearly),
- quality assurance plans,
- PZJ for individual licensed activity – repositories.

PZJ developed to the requirements of SÚJB Decree No. 214/1997 Coll. describe the scope and method of application in respect to the relevant parts of the quality management system for the performance of individual activities, and determine the scope of application for activities described in the quality management documents.

6.3.1.5.3 Quality Assurance Programs of ÚJV Řež a. s.

ÚJV Řež stores SF from research reactors and RAW generated from some other activities at its own site. RAW collection, transport, processing, and storage are handled in a similar way. In order to assure quality of the above activities, the company has implemented a quality management system described in a quality management manual, management QA procedures, and a set of management documents.

The Integrity and Technical Engineering Division operates the HLW storage facility. The quality management program for activities of the HLW storage facility describing the comprehensive measures to ensure safe operation of the facility was developed in compliance with the Decree No. 214/1997 Coll. A similar function is provided by the quality assurance program for the RAW management.

For the individual element of the quality assurance system to be fulfilled, both the documents focus on application of systematic measures to review, inspect, and improve efficiency of the processes.

6.3.1.6 Quality Assurance Program Efficiency Evaluation and Application Methods

6.3.1.6.1 Quality Assurance Program Efficiency Evaluation in ČEZ, a. s.

ČEZ, a. s. has established responsibilities for process quality management and verification at all levels (the so-called process owners). The responsibilities for equipment quality and process verification are provided in management documents, which are a part of the documented quality management system. The responsibility for quality system implementation rests with all company managers. Each employee is responsible for quality of his/her own work. The persons who perform inspections and verifications are given the sufficient authority to identify nonconformities and demand appropriate corrective actions if necessary. The stipulated quality shall be verified by persons who do not perform inspection or verification activities. All employees are entitled to initiate improvements or revisions of the quality management system.

For maintenance and improvement of the quality management system the regular quality instructing and training of ČEZ, a. s. employees is perceived as an investment in quality. ČEZ, a. s. uses an integrated training process for its employees in the scope of quality assurance and improvement at each level of management.

The quality system is evaluated for efficiency and the system is updated periodically at the end of each calendar year. Supervisors at each level of management perform periodic assessment of all processes and procedures in their scope of responsibility aimed to review their condition and efficiency. The quality management system of NPP Dukovany where ISFSF Dukovany is operated is subject to evaluation on a quarterly basis.

6.3.1.6.2 Quality Assurance Program Efficiency Evaluation in SÚRAO

The supervisory activities are used to provide feedback at each level of management making it possible to demonstrate compliance of the established requirements for quality and the pursued activities. All supervisors periodically review key processes and procedures in their scope of responsibility. An expert for quality assurance provides periodical assessment of the quality system as a whole. The audits (external, internal, or supplier's) are used to identify the state of activities and processes, and to verify efficiency of the quality assurance system of SÚRAO, as well as the systems of suppliers of items important for nuclear safety and radiation protection. A training system has been implemented so that all of the activities are performed and supervised by people with the appropriate skills and qualifications, and the activities especially important for nuclear safety and radiation protection are performed by people qualified as per Decree No. 146/1997 Coll., as amended by 315/2002 Coll.

6.3.1.6.3 Quality Assurance Program Efficiency Evaluation in ÚJV Řež a. s.

To evaluate efficiency of the quality assurance programs ÚJV Řež utilizes supervision controls, process efficiency assessment and feedback. For this purpose, the following shall be performed:

- validation of input documents;
- identification of supervisory activities in the project design stage (operating activities);
- definition of contingencies and risks;
- proposal of inspection procedures and specification of reference parameters for the processes;
- definition of corrective actions and their verification;
- verification of efficiency of the stipulated measures by the Division Supervisory Committee for Nuclear Safety and Radiation Protection;
- review of feedback application by the Nuclear Safety and Radiation Protection Supervisory Committee of ÚJV Řež, or discussion of serious events by the company management.

6.3.1.7 Current Practices of State Supervision in Quality Assurance

According to Section 39 of the Atomic Act, SÚJB is responsible to perform supervision of the licensee for compliance with provisions of this Act, including the above-mentioned requirements for quality assurance. If deemed necessary, SÚJB may extend this task to cover also contractors of the licensee. The supervision is focused both on the system and quality assurance of the specific classified equipment. The SÚJB departments responsible for this task are primarily Department for Evaluation of Nuclear Installations, Division of Radioactive Waste and Spent Fuel Management and Department of Fuel Cycle Radiation Protection (see Fig. 5.2).

In compliance with the Atomic Act, SÚJB shall approve quality assurance programs of nuclear installations for disposal and storage of SF and disposal and storage of RAW that are essential for issue of the below licenses as per Section 9, paragraph 1 of the Atomic Act:

- NI / RAW repository siting,

- NI / RAW repository construction,
- NI commissioning stages,
- NI / RAW repository operation,
- reconstruction or other changes having impact on nuclear safety, radiation protection, physical protection, or emergency preparedness of NI / RAW repository,
- NI / RAW repository decommissioning stages,
- management of ionizing radiation sources,
- RAW management,
- management of nuclear materials,
- professional training of selected persons,
- personal dosimetry and other services important for radiation protection.

In review of quality assurance programs, verification is primarily focused on compliance with requirements under SÚJB Decree No. 214/1997 Coll.

SÚJB is also responsible to approve selected documents related to the quality assurance issues where the requirement for approval is stipulated under the Atomic Act.

6.4 Operational Radiation Protection

1. Each Contracting Party shall take the appropriate steps to ensure that during the operating lifetime of a spent fuel or radioactive waste management facility:

(i) The radiation exposure of the workers and the public caused by the facility shall be kept as low as reasonably achievable, economic and social factors being taken into account;

(ii) No individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection; and

2. Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited:

(i) To keep exposure to radiation as low as reasonably achievable, economic and social factors being taken into account; and

(ii) So that no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection.

3. Each Contracting Party shall take appropriate steps to ensure that during the operating lifetime of a regulated nuclear facility:

(i)Measures are taken to prevent unplanned or uncontrolled release of radioactive materials into the environment; and

(ii)In the event that an unplanned or uncontrolled release of radioactive materials into the environment occurs, appropriate corrective measures are implemented to control the release and mitigate its effects.

6.4.1 Summary of National Legislation for Radiation Protection

The radiation protection for nuclear installations in the Czech Republic is regulated by the Atomic Act and its implementing regulation No. 307/2002 Coll., on radiation protection which entirely amended the original Decree No. 184/1997 Coll., on radiation protection requirements.

The radiation protection legislation consistently follows internationally respected principles of radiation protection based on recommendations provided by prestigious international non-governmental expert organizations (ICRP), in particular the ICRP recommendation No. 60 issued in 1990, and associated international basic standards for radiation protection adopted by the intergovernmental organizations, including IAEA. The above rules were also initiated by efforts to harmonize the radiation protection legislation of the Czech Republic with the relevant EU directives, in particular the European Commission Directive 96/29/Euratom of 13 May 1996. The radiation protection was fully harmonized with the EU law in 2002 by amendment to the Atomic Act and its implementing regulation – Decree No. 307/2002 Coll., on radiation protection.

The Atomic Act defines a system aimed to protect persons and the environment against non-desirable effects of ionizing radiation. The primary obligations when utilizing nuclear energy and ionizing radiation, as well as the conditions for performance of tasks related to nuclear energy utilization or radiation practices are specified in Section 4 of the Atomic Act. They include particularly the following general obligations:

- make sure that nuclear energy utilization, radiation practices or interventions to reduce exposure due to a radiation incident are justified by benefits that compensate for the risks that will or may arise from performance of such tasks (the justification principle),
- maintain such a level of radiation protection when utilizing nuclear energy or performing radiation practices or interventions to reduce exposure due to a radiation incident that the risk to human life, health and the environment is as low as reasonably achievable when the economic and social aspects are considered (the optimization principle, or ALARA principle),
- reduce personal exposure during radiation practices so that total exposure caused by a possible combination of exposure from all radiation practices does not exceed the aggregate limits of exposure set forth by the State Office for Nuclear Safety (the dose limitation principle),
- reduce personal exposure from involvement in the interventions in case of a radiation incident so that it does not exceed ten times the limits specified for exposed workers unless it is a matter of saving human lives or preventing the development of radiological emergency, potentially causing extensive social and economic consequences.
- intervene to divert or limit exposure if the exposure has reached or without any intervention may reach the level causing immediate damage to health, or the exposure has exceeded or without any intervention may exceed the limits set forth in the implementing regulation, and if the mitigation of damage or detriment to health expected from the intervention is sufficient to justify the damage and cost associated with the intervention. The implementing regulation shall establish the limits and detail the rules for preparation and performance of interventions.

As stated in the Atomic Act, a SÚJB license is required for the activities as listed under Section 9 (siting, construction, commissioning stages, etc. – for details see Chapter 5.2). This requirement also applies to discharging of radionuclides into the environment and to RAW management as well. For the licensees, a number of additional requirements are set forth under Sections 17 through 20 of the Atomic Act. The following requirements focus on radiation protection of a nuclear installation:

- establish radiation protection in the scope corresponding to each license and provide systematic supervision of compliance with the rules of radiation protection;
- follow the terms of the license issued by SÚJB, proceed in compliance with the approved documentation, investigate immediately any breach of those terms or procedures and adopt corrective measures to prevent recurrence of any such event, including the obligation to immediately report to SÚJB of all incidents when any of the exposure limits was exceeded;
- adhere to the technical and organizational conditions for safe operation of nuclear installations prescribed under the implementing regulations,
- participate in the national radiation monitoring network within the scope stipulated by the Government Order,
- report immediately to SÚJB of any variation or event important for radiation protection, or any alteration to the facts critical for issue of a license,
- present information to the public on provisions for nuclear safety and radiation protection, unless the information is deemed state, official or business secret,
- monitor, measure, evaluate, verify, and keep record of the parameters and material facts important for radiation protection in the scope stipulated under the implementing regulations, including radiation monitoring of persons, workplaces and the environment, and keep and maintain records of these facts to be submitted to SÚJB in a manner specified in the implementing regulation,
- limit generation of RAW and SF to the necessary extent,
- process and submit to SÚRAO the data on short-term and long-term generation of RAW and SF, and other data necessary to establish the amount and method of payment to the nuclear account,
- keep track of RAW by the type of waste in such a manner that all the characteristics important for safe handling are evident,
- provide initial and periodic preventive medical checkups at least once a year for workers in category A, and in cases where exposure limits were exceeded as reviewed by the Office, provide extraordinary and follow-up medical checkups if recommended by the Office, and verify the mental capability of those employees who perform tasks that immediately affect nuclear safety
- set up a training and testing system for qualification and special professional competence of employees based on the relevance of their jobs.

In case of a radiation incident, the licensee shall be obligated, in the scope and manner set forth in the internal emergency plan approved by SÚJB, in particular to:

- notify immediately the appropriate municipal office with extended powers, SÚJB and other affected bodies listed in the internal emergency plan, of the occurrence or suspected occurrence of a radiation accident,
- in case of a radiation accident immediately alert the population in the emergency planning zone,
- remove immediately the consequences of a radiation accident from the areas operated by the licensee, and perform actions to protect the personnel and other persons against the ionizing radiation effects,
- provide for monitoring of exposure of the employees and other persons, and release of radionuclides and ionizing radiation into the environment,
- advise the affected authorities of the monitoring results, and the actual and expected situation, and the actions taken to protect the personnel and population, and the actions taken to remove the radiation accident, and of the actual and estimated exposure of persons,
- control and regulate the exposure of employees and persons working to remove the radiation accident from the areas operated by the licensee,
- cooperate to remove the consequence of a radiation accident in the facility of the licensee,
- in the event of a radiation accident, participate in the activities of the national radiation monitoring network.

The rights and obligations applicable to the RAW management are stipulated in the Atomic Act, Chapter four.

The essential Decree to implement the Atomic Act in the area of radiation protection is Decree No. 307/2002 Coll., on the radiation protection. The Decree specifies details of the method and scope applied to protection of individuals and the environment against the undesirable effects of ionizing radiation during radiation practices, medical exposure, emergency exposure, lasting exposure, and potential exposure, thus being used to implement the great majority of authorities given under the Atomic Act in terms of radiation protection. This Decree does not apply to exposure from natural background, i.e. from radionuclides naturally contained in human body, cosmic radiation common on the earth surface, radiation caused by radionuclides present the earth crust intact by human intervention or any other radiation from natural sources of ionizing radiation not modified by human intervention. Decree No. 307/2002 Coll. contains requirements from ICRP recommendation No. 60, IAEA Basic Safety Standards No. 115 and Directive No. 96/29/Euratom.

The Decree No. 307/2002 Coll. *„regulates the below items in compliance with the law of the European Community:*

a) details of the method and the scope of radiation protection during work at the workplaces where radiation activities shall be performed including the details related to delineation, identification, notification and approval of supervised and controlled areas at the workplaces;

b) details referred to performance of work activities associated with an increased presence of natural radionuclides or increased influence of cosmic radiation which lead or may lead to a significant increase in exposure of individuals (hereinafter referred to as „work activities with the increased exposure to natural sources“) in such a way that the affected workplaces and *individuals, measurement scope and guidance levels for interventions to reduce the increased exposures to natural sources shall be set out;*

c) *details on the rules for preparation or implementation of remedial actions to avert or reduce exposures as well as the guidance levels for the interventions shall be laid down;*
d) *exemption levels as specified in Basic Safety Standards No. 115 and clearance levels expresses as activity concentration which determine when a material can be released in the environment without a permit, on condition that the effective dose associated with the discharge in the environment shall not exceed 0.01 mSv/year for any individual person and the collective dose associated with the discharge in the environment shall not exceed 1 Sv/year,*
e) *exposure limits, dose constraints, maximum permitted levels of natural radionuclide concentrations in building materials and maximum permitted levels of radioactive contamination of foodstuffs;*
f) *details about the classification of ionizing radiation sources, the categorization of exposed workers and the categorization of workplaces where radiation activities shall be performed;*
g) *technical and organizational requirements, procedures and guidance levels to demonstrate the radiation protection optimization;*
h) *the scope and the method of ionizing radiation source management, handling of radioactive waste and radionuclide discharge into the environment for which the license shall be required, and it regulates the details for ensuring radiation protection during the radiation activities;*
i) *conditions of medical exposures, diagnostic reference levels and usually the rules for exposure of physical persons who voluntarily help the persons undergoing medical exposure;*
j) *technical and organizational conditions for safe operation of ionizing radiation sources and workplaces with ionizing radiation; and*
k) *quantities, parameters and the facts impacting radiation protection and sets out the scope of monitoring, measurements, evaluation, verification, recording, keeping records and the method of data transfer to the State Office for Nuclear Safety (hereinafter referred to as „Office“).*

The Decree No. 307/2002 Coll. also stipulates classification criteria for ionizing radiation sources as insignificant, minor, simple, significant and very significant sources (Sections 4 through 10), classification criteria for workplaces where radiation activities are performed (Sections 11 through 15) and classification criteria for radiation personnel (Section 16). The Decree also details the procedures and criteria applicable to radiation protection optimizing (Section 17), including specification of the exposure limits (Sections 18 through 22).

6.4.2 Implementation of Radiation Protection Requirements

6.4.2.1 Dose Constraints

The most common limits used to regulate whole body exposure are presented by the international recommended parameters describing the radiation effect on the whole human body (i.e. effective dose). They are applied to the total of effective external doses plus committed effective internal doses for a certain period of time. There are no limits specified for periods less than one calendar year, or more than five consecutive calendar years.

The limits are set lower for the population, that is the individuals whose exposure is typically inadvertent and involuntary than those for the individuals who are aware of the risk taken, and their exposure is voluntary and deliberate whether part of their job, or part of their training for such a job.

The effective dose constraints set for category A and B radiation workers, i.e. persons above 18 years, whose exposure to the ionizing radiation sources at their jobs is deliberate and voluntary, who have been in a proven manner informed about the possible exposure level at work, as well as about the associated risks, shall be 100 mSv within five consecutive calendar years while the value of 50 mSv shall not be exceeded in one calendar year. For employees in category A, which must include among others all persons working in the controlled areas of nuclear installations, routine and regular monitoring of personal exposure shall be introduced, as well as records of personal doses to be kept at least for 50 years. For monitoring of category A and B workers, Decree No. 307/2002 Coll. also established the so-called derived limits which are easier to track and control and using more directly measurable parameters.

The effective dose constraints for persons aged 16 to 18 (students and apprentices), who get into contact with the ionizing radiation sources deliberately and voluntarily, having been in a provable manner informed about the possible exposure at work, as well as about the associated risks, within specialized training for their work with the ionizing radiation sources, shall be 6 mSv per calendar year.

The general effective dose constraints, that is the limits applicable to any other population, shall be 1 mSv per calendar year, or as specified under the license for operation of Category III or IV workplaces exceptionally 5 mSv within five consecutive calendar years.

The general limits for population in the vicinity of the workplace where radiation activities are being performed shall apply to the average calculated exposure of the critical group of population, and for all routes of radiation from any source of ionizing radiation, and for any radiation practices being considered. If there are no direct data available for calculation conservative estimates of factor variations that may affect propagation of radionuclides or the individual's exposure in the critical group shall be used. In order to facilitate supervision of adherence to the exposure limits for population in the vicinity of a specific installation SÚJB has the right to establish the dose constraints only applicable to radiation from the particular installation to be used as the upper bound for optimizing of radiation protection in respect to the population in the installation vicinity.

6.4.2.2 Conditions for Discharge of Radioactive Material

Discharging of radioactive material from NIs, both liquid and gaseous, is subject to licenses issued by SÚJB as per the provisions of the Atomic Act (Section 9, paragraph 1, letter h), and detailed information, including the criteria for issue of such a license, is given under Sections 56 and 57 of Decree No. 307/2002 Coll. The discharge of materials containing radionuclides into the atmosphere or waters may only be approved if such provisions are made that the effective doses received by the particular critical group of population due to these releases shall not exceed 250 µSv per year. In addition, the general limit of 1mSv applicable to the annual effective dose from any sources also applies to radioactive releases from nuclear installations. The release shall be justified and optimized.

The authorized limits for discharges from nuclear installations are not specified in any regulatory document. They are determined individually by SÚJB for each particular nuclear installation and they are set below 50 μSv/year for both the Czech NPPs. The achieved values of discharges are controlled and evaluated by the plant operators based on a discharge monitoring program approved by SÚJB.

There is an extensive monitoring system in place to monitor the actual discharges provided for by the operators of the nuclear installations, as well as independent measurements performed directly by SÚJB or through SÚRO. The measurement results are reliable enough to document that the authorized limits are not exceeded.

6.4.2.3 Radiation Protection Optimizing

The technical and organizational requirements, guidance levels and procedures to demonstrate the level of radiation protection as reasonably achievable are specified under Section 17 of Decree No. 307/2002 Coll. They shall be reviewed for the licensing process or periodical inspections. For a nuclear installation, the following is included:

- prior to start of operation, alternative solutions considered for radiation protection shall be reviewed and compared, as well as the cost of the associated protection measures, collective doses and doses for the relevant critical groups of population,
- in the course of operation, the received doses shall be reviewed regularly (yearly) depending on the task performed while additional possible actions to ensure radiation protection are considered and compared with similar operations.

The reasonably achievable level of radiation protection may be demonstrated using a procedure which compares the cost of alternative measures to improve radiation protection (e.g. building additional barriers) with the financial assessment of the expected reduction in exposure. The reasonably achievable level of radiation protection is considered as proved and the measure does not need to be implemented if the cost should be higher than the benefit of such a measure. In that respect, the Decree No. 307/2002 Coll. established values of the monetary equivalent of reduction in the collective effective dose for the exposed workers or the population, and that is graded based on the relation of the estimated average effective dose and the exposure limits. The decree also considers the need for valorization of these amounts.

6.4.2.4 Radiation Monitoring in the Vicinity of Nuclear Installations

The operator (licensee) shall be responsible for radiation monitoring in the vicinity of the nuclear installation. A monitoring program authorized by SÚJB shall be followed. This monitoring program shall establish the scope, frequency, and methods of measurement and evaluation of results, as well as the associated reference levels. At present, the monitoring in the vicinity of nuclear installation is performed directly by the operator through its environment radiation monitoring labs. SÚJB shall perform supervision of whether the monitoring program is followed, as well as its own independent measurements.

The dose rate is being continuously monitored in the vicinity of NPP Dukovany and Temelín using a teledosimetric system operated by the NPPs. In addition, there is at least one monitoring point of the national independent timely identification network (see Chapter 6.5) located in the vicinity of each NPP. The dose equivalent from external radiation is monitored in the vicinity of NPP using the local networks of thermoluminiscent detectors controlled by the radiation monitoring laboratory of the particular NPP. Independent of those networks, the relevant regional centers of SÚJB perform measurements using thermoluminiscent detectors. In the present operation, none of the examined levels in any of the mentioned networks have been exceeded.

The environment around the operated NPP Dukovany is regularly sampled and measured by the Radiation Monitoring Lab and the independent Regional Center of SÚJB in Brno. The Environment Radiation Monitoring Lab and the Regional Center of SÚJB in České Budějovice monitors the vicinity of NPP Temelín.

Since the NIs are included in the National Radiation Monitoring Network, the supervisory bodies are periodically provided with summaries of measurement results. In addition, the utility takes its own initiative to issue various information materials for the public. This area is regulated by the Government Order No. 11/1999 Coll., on the emergency planning zone (see Chapter 5.2).

There are additional measurements performed in the vicinity of each NPP, in particular aimed to detect and assess any possible radioactive leaks, and to provide a credible basis for decision-making about measures to protect the population. These measurements are performed within the National Radiation Monitoring Network whose function and structure are stipulated under the Decree No. 319/2002 Coll. SÚJB manages activities of the National Radiation Monitoring Network, including its permanent and emergency components. The permanent components are used for monitoring under regular operating conditions while the emergency components are activated under emergency conditions. The regular mode is primarily used for monitoring of the current radiation situation and early detection of a radiation accident while the emergency mode is used to evaluate consequences of an accident. The results of monitoring are reported in annual reports on the radiation situation on the territory of the Czech Republic to the Civil and Emergency Planning Committee, as well as to the public through regional offices, hygienic stations, or libraries.

The permanent components of the Radiation Monitoring Network may be divided into the following groups:

- timely identification network comprising 58 continuously operated measurement points with automated transfer of the measured values to the central database. These are controlled by CHMÚ, and a single measurement point is operated by SÚRO and SÚJCHBO in Příbram,
- territorial TLD network of 184 measurement points equipped with thermoluminiscent dosimeters. This network is operated by the regional centers of SÚJB with assistance of SÚRO,
- local TLD networks of 78 measurement points equipped with thermoluminiscent dosimeters in the vicinity of NPP Dukovany and NPP Temelín operated by NPP and the Regional Centers of SÚJB in Brno and České Budějovice,

- territorial measurement network for air contamination comprising of 11 measurement points equipped with high-capacity aerosol and pollutant sampling equipment operated by SÚRO, and the regional centers of SÚJB, and the NPP environment radiation monitoring labs.
- lab network including 6 laboratories of the regional SÚJB centers, and 3 radiation monitoring labs of SÚRO, and 2 NPP environment monitoring labs equipped to perform gamma spectrometry, or possibly radiochemical analysis of radionuclide contents in the environmental samples (such as aerosols, pollutants, food, drinking water, or feed, etc.)
- mobile teams (aircraft or cars) operated by SÚJB or its regional centers, and SÚRO, the Ministry of Defense, Ministry of the Interior, and NPP Dukovany and Temelín provided with the air (volume activity) and ground (radionuclide deposition) dose rate measurement devices,
- Czech Army network including 15 fixed measurement points of which 2 are under automated trial operation.

The purpose of the measurement monitoring program within the Radiation Monitoring Network is to track space and time distribution of radionuclides activity and ionizing radiation doses on the territory of the Czech Republic, in particular aimed to provide long-term trends and identify any deviations in a timely manner. The attention is given to artificial radionuclides of which those measurable and traceable are below:

- ^{137}Cs, ^{90}Sr, $^{239+240}Pu$ and ^{85}Kr in the atmosphere,
- ^{137}Cs, ^{90}Sr and ^{3}H in foodstuffs,
- ^{137}Cs in human body.

It was proven by participation in international exercises that the Czech Radiation Monitoring Network as a whole is on comparable with the Europe's standards in respect to its equipment, as well as to the density of measurement points.

6.4.3 Supervision

As stated in the Atomic Act, SÚJB is responsible for state supervision of radiation protection in the Czech Republic. SÚJB is authorized under the Atomic Act to issue regulations implementing the act and to issue appropriate licenses for management of ionizing radiation sources and other radiation practices as specified by the act – see Chapter 5.2.2.

SÚJB radiation protection inspectors supervise the radiation protection. At present, there are 52 inspectors in total, at the headquarters in Prague and at seven detached workplaces all over the country referred to as the regional centers. The inspectors shall posses technical skills in the supervised area and have a relevant university degree plus three years of technical experience. The inspectors are appointed by the chairperson of SÚJB – see Chapter 5.3 for more details.

There are three types of supervision:

- standard (routine) supervision performed by the regional centers,

- specialized supervision by a team of experienced inspectors for NPP, mining and processing of uranium, RAW, nuclear medicine, radiotherapeutic sources, radiodiagnostic sources, or the major industrial and natural sources,
- specific ad hoc supervision by supervisory teams consisting of the most experienced inspectors.

A large number of internal supervision guides have recently been prepared, as well as inspection documents, to evaluate different types of supervision, and those are currently used for all types of supervision.

6.5 Emergency Preparedness

1. *Each Contracting Party shall ensure that before and during operation of a spent fuel or radioactive waste management facility there are appropriate on-site and, if necessary, off-site emergency plans. Such emergency plans should be tested at an appropriate frequency.*
2. *Each Contracting Party shall take the appropriate steps for the preparation and testing of emergency plans for its territory insofar as it is likely to be affected in the event of a radiological emergency at a spent fuel or radioactive waste management facility in the vicinity of its territory.*

6.5.1 Applicable Law

The obligations of licensees, that is operators of nuclear installations or workplaces where the radiation activities are performed, including the SF and RAW management, in the area of emergency preparedness are primarily established under the Atomic Act, and its implementing regulations or the associated government orders. The additional obligations are specified in other regulatory guides such as Act No. 239/2000 Coll., Act No. 240/2000 Coll., Government Order No. 462/2000 Coll., or Decree by the Ministry of the Interior No. 328/2001 Coll., all of them as amended later.

The Atomic Act, Section 2 also defines the basic terms of emergency preparedness:

- *"Emergency preparedness means an ability to recognize the occurrence of a radiological emergency and, upon its occurrence, to carry out measures specified in emergency plans*
- *Radiation incident means an event resulting in an inadmissible release of radioactive substances or ionizing radiation, or an inadmissible exposure of individuals,*
- *Radiation accident means radiation incident requiring urgent measures in order to protect the population and environment,*
- *Radiological emergency means a situation following the radiation accident or such radiation incident or such increase in level of radioactivity or exposure which require urgent action in order to protect individuals,*
- *Emergency plan means a set of planned measures to deal with a radiation incident or radiation accident and to limit their consequences which is elaborated for:*
  - *Nuclear installation premises or workplaces in which radiation activities are performed (on-site emergency plan),*
  - *Transport of nuclear materials or ionizing radiation sources (emergency rule),*

- *The region in the vicinity of the nuclear installation or the workplace with a source of ionizing radiation where, based on results of analyses of potential radiation accident consequences, emergency planning requirements are in force and which is called emergency planning zone (off-site emergency plan).”*

The section also explains the concept of emergency exposure of persons due to a radiation incident or a radiation accident, and emergency exposure of intervening individuals, or lasting exposure resulting from long-term after-effects of a radiological event.

This section also defines:

- NIs including RAW repository, except of the repositories containing solely natural radionuclides, or RAW storage facilities with activity exceeding the values set out in the implementing guide,
- *„Radiation activity which involves an activity that may increase the exposure of individuals to radiation from an artificial sources of ionizing radiation, except activity in the case of radiological emergency.“*

As per Section 3 of the Atomic Act, SÚJB shall be empowered e.g. to:

- *„Approve the on-site emergency plans, or their changes subject to discussion of interfaces with the off-site emergency plans; the on-site emergency plan shall be approved prior to granting a commissioning and operating license for any nuclear installation or workplace where radiation activities are performed,*
- *Approve the emergency rules for transport of nuclear materials or radioactive substances specified under the relevant implementing legal regulation,*
- *Establish the emergency planning zone, or if applicable, its further structuring upon request of the licensee,*
- *Control the activity of the National Radiation Monitoring Network and support the function of its head-office,*
- *Support the activity of the Emergency Response Center and international exchange of data related to radiation situation,*
- *Ensure by means of the National Radiation Monitoring Network and based on assessment of a radiation situation, the availability of background information necessary to take decisions aimed at reducing or averting exposure in the case of a radiation accident.“*

The Atomic Act, Section 4 sets forth general conditions for interventions aimed to eliminate or reduce exposure during radiation incidents, or exposure of the intervening persons. These conditions are detailed in SÚJB Decree No. 307/2002 Coll., on radiation protection.

The Atomic Act, Section 17 requires the licensee, as part of his general obligations, to ensure emergency preparedness, including verification in the scope of each license, and to report to SÚJB immediately on any variance relevant for emergency preparedness, including any changes to the facts critical for issue of the license.

Provisions of Section 18 of the Atomic Act set forth, among other obligations of the licensee, the responsibility to:

- *Monitor, measure, evaluate, verify and record values, parameters and facts impacting on emergency preparedness, to the extent laid down in an implementing regulations,*
- *Keep and archive records of ionizing radiation sources, facilities, materials, activities, quantities and parameters and other facts related to emergency preparedness, and submit the recorded information to the Office in the manner set out in an implementing regulation,*
- *Ensure systematic supervision of observance of emergency preparedness, including its verification.“*

The Atomic Act, Section 19, paragraph 1 establishes the following obligations for the licensee in case of a radiation incident occurence, in the scope and manner specified in the on-site emergency plan approved by SÚJB:

- “*In accordance with a special legal regulation, notify immediately the relevant municipal offices with extended powers, the Office and other relevant bodies specified in the on-site emergency plan of the occurrence or suspected occurrence of a radiation accident,*
- *Remove promptly the consequences of the radiation incident from the premises where his activities are performed and take steps to protect employees and other persons from the effects of ionizing radiation*,
- *Provide monitoring of exposures of employees and other persons and prevent any leaks of radionuclides or ionizing radiation into the environment,*
- *Advise the relevant bodies especially of monitoring results, actual or anticipated progress of the situation, interventions taken to protect employees and the public, and interventions taken to remove the radiation incident as well as of the actual and anticipated exposure of individuals,*
- *Control and regulate exposure of employees or persons participating in removal of the radiation incident on the premises where his activities are performed,*
- *Cooperate to remove the consequences of the radiation incident that occurred on his premises.”*

The Atomic Act, Section 19, paragraph 3 sets forth the obligation of the licensee to submit the necessary data to the appropriate regional authority and the involved municipal offices with extended powers in order to prepare the off-site emergency plan, and to provide cooperation to establish emergency preparedness in the emergency planning zone in the scope as per the government order, and to share the cost of provisions for the emergency preparedness.

Details and requirements applicable to emergency preparedness for extraordinary events (radiation incidents or accidents) are specified in the following implementing regulations of the Atomic Act:

- SÚJB Decree No. 318/2002 Coll., on the details for emergency preparedness assurance at nuclear installations or workplaces with sources of ionizing radiation, and on requirements for the content of on-site emergency plans and emergency rules,
- SÚJB Decree No. 307/2002 Coll., on the radiation protection, and
- Government Order No. 11/1999 Coll., on the emergency planning zone.

The SÚJB Decree No. 318/2002 Coll. defines, as another term from the area of emergency preparedness, the extraordinary event, and provides the details to establish emergency preparedness at nuclear installations or workplaces where radiation activities are performed:

- identification of extraordinary event occurrence,
- assessment of the extraordinary events significance and their classification in three basic degrees,
- announcing an extraordinary event,
- management and implementation of the intervention,
- methods to limit exposure of the employees and other persons,
- training of the employees and other persons,
- verification emergency preparedness.

The Decree also specifies the following:

- requirements for intervention procedures and instructions,
- medical support principles,
- documentation requirements for actions during an extraordinary event,
- requirements for data submitted to SÚJB concerning the occurrence and development of an extraordinary event,
- testing and verification requirements for emergency preparedness,
- requirements for the content of an on-site emergency plan and emergency rules,
- documentation maintenance requirements for an extraordinary event,
- additional documentation requirements for emergency preparedness.

Concurrently, the Decree establishes the scope of documentation to be provided by the licensee for emergency preparedness, i.e. on-site emergency plans and intervention instructions, for each category of workplaces[2] where radiation activities are performed, as well as the requirement for their periodical revision once in three years.

The Decree No. 307/2002 Coll., Sections 98 through 103 sets forth for interventions during an extraordinary radiation event:

- general rules for the preparation and execution of interventions aimed to eliminate or reduce the emergency exposure,
- principles for decision making and implementation of the emergency protective measures to limit exposure of the individuals and the environment, including the intervention level limits

The Act No. 239/2000 Coll., on the Integrated Rescue System, as amended later, defines the basic and other units of the Integrated Rescue System, their scope and power of the regulatory bodies and the regional or municipal authorities, and the rights and duties of legal entities or natural persons applicable to the preparation for extraordinary events, and the process of rescue and removal work, and protection of the population in case of emergency, including radiation accidents. This Act stipulates the basic requirements for regional offices and municipal offices

[2] The categories are specified under SÚJB Decree No. 307/2002 Coll., on radiation protection.

with extended powers in respect to preparation of the off-site emergency plans for rescue or removal work in the emergency planning zones being part of the regional crisis plans developed pursuant to Act No. 240/2000 Coll., on crisis management (Crisis Act), as amended later. This Act also stipulates the obligations of regional offices, municipal offices with extended powers, and legal entities or natural persons in relation to management of crisis situations on the territory affected by an extraordinary event.

The Act No. 240/2000 Coll., on crisis management (Crisis Act), as amended later, defines the scope and power of the regulatory bodies and the regional or municipal authorities, and the rights and duties of legal entities or natural persons applicable to the preparation for extraordinary events, and to their solution. It addresses the issue and role of the safety boards in respect to crisis preparedness and the crisis staff in case of emergency. It stipulates the requirements for development of a crisis plan for the central state administration bodies, and the regional state administration bodies, as well as the local governments, or when an emergency state is declared.

The Government Order No. 462/2000 Coll. as authorized by Act No. 240/2000 Coll. stipulates the requirements for crisis documents, which may be potentially misused and which shall be treated as special facts. It also specifies the requirements and method of development for a crisis plan of the central and regional state administration bodies or the local governments (regional offices, municipal offices with extended powers and municipal offices), and the emergency preparedness plans of legal entities or natural persons in business to keep on alert and be prepared to implement the crisis measures and protect against the effects of crisis situations.

The Decree by the Ministry of the Interior No. 328/2001 Coll., as amended later specifies the details of provision for the Integrated Rescue System. It also stipulates the principles and method of development, approval a use of the off-site emergency plan for the defined emergency planning zone of a nuclear installation or a workplace with a very important source of ionizing radiation.

6.5.2 Implementation of Emergency Preparedness Measures, including the Role of State Supervision and Other Bodies

6.5.2.1 Classification of Extraordinary Events

In order to evaluate the importance of extraordinary events that might occur during operation of a nuclear installation or a workplace where radiation activities are performed, the events are classified in three basic levels (Section 5 of SÚJB Decree No. 318/2002 Coll., as amended later):

- *„Level 1 – An extraordinary event that might or shall result in non-permissible exposure of employees and other individuals, or non-permissible radioactive release into the environment of a nuclear installation. Level 1 event may be a radiation incident of limited or local nature, and it can be removed using the forces and means of the operating or shift personnel,*
- *Level 2 – An extraordinary event that might or shall result in significant non-permissible exposure of employees and other individuals, or non-permissible radioactive release into the environment which does not require to perform actions to protect the population and the environment; Level 2 event can be resolved by activation of the intervening persons of the*

licensee, that is using the forces and means of the licensee, or the forces and means contracted by the licensee.

- *Level 3 – An extraordinary event specified in the off-site emergency plan that might or shall result in significant non-permissible radioactive release into the environment, and it requires to perform immediate actions to protect the population and the environment; Level 3 event requires not only activation of the intervening persons of the licensee plus the intervening persons under the off-site emergency plan, but even other affected bodies must be involved."*

6.5.2.2 National Emergency Preparedness and Response Systems

In compliance with the legislation, in particular for the area of crisis management, the emergency preparedness system was established in the Czech Republic for various crisis situations. Figure 6.1 outlines the basic structure of the crisis (emergency) preparedness system.

An extraordinary event - an accident in the Czech Republic or abroad, with a potential impact on the territory of the Czech Republic, shall be addressed using the crisis (emergency) response system of the basic structure as shown in Fig. 6.2.

The Czech Government is the superior body responsible for preparedness for crisis situations and, if such situations arise, for their management on the country's territory. The Constitutional Act No. 110/1998 Coll., on safety of the Czech Republic, established the National Safety Board. Further to the act, the government in its resolution No. 391 of 1998, as amended later, established membership on the National Safety Board and approved its main tasks in preparedness for crisis and management of crisis situations.

Concurrently with the resolution No. 391 of 1998 the government also established a Committee for Civil and Emergency Planning, as a standing working body of the National Safety Board, to coordinate and to plan provisions for internal national security, protection of population and economy and coordination of requirements for civil resources necessary to assure safety of the Czech Republic. The tasks in planning and preparedness for a radiation accident fall in the competence of the Committee for Civil and Emergency Planning and the tasks in management of radiation accidents fall in the competence of the Central Crisis Staff, a working body of the government to deal with crisis situations.

The main tasks in planning of and preparedness for crisis situations, including radiation accidents, are specified by the rules of procedure of the Committee for Civil and Emergency Planning. The tasks focus on protection of internal national security, protection of population and economy, particularly on:

- operative interdepartmental coordination of planning and preparatory activities,
- assessment and consideration of planning, policy-making and preparatory activities submitted by central state administration bodies,
- assessment and consideration of requirements made by central state administration bodies for civil resources,
- discussing and evaluation of interdepartmental commenting procedures on materials and recommending of materials to be discussed by the National Safety Board,

- assessment, discussing and coordination of activities performed by representatives of the Czech Republic in NATO bodies and in other international entities,
- processing and coordination of activities in the area of humanitarian aid and rescue works.

The Committee for Civil and Emergency Planning is presided by the Minister of the Interior and its members are deputies of ministers and the SÚJB chairperson. The Committee has also established specialist working groups.

The groups are made up of experts (specialists) in respective fields of population and environmental protection in case of extraordinary events (industrial accidents, natural disasters etc.).

The Central Crisis Staff was instituted at the national level as the working body of the National Safety Board to handle crisis situations, including radiation accidents. The Central Crisis Staff is presided by the Minister of the Interior. Other members of the Central Crisis Staff include deputies of ministers and senior executives of other central state administration bodies, including SÚJB chairperson.

The Central Crisis Staff is activated also in case of a radiation accident outside the Czech Republic's territory, provided the Czech Republic's territory may be affected by the accident, and in case of radiation accidents during transport of nuclear material and radioactive substances.

6.5.2.3 On-site Emergency Plans of Nuclear Installations or Workplaces with Radiation Activities – SF or RAW Management

The nuclear installations or workplaces where radiation activities are performed, that is also the SF or RAW management activities, shall prepare both the on-site emergency plans and intervention instructions in compliance with SÚJB Decree No. 318/2002 Coll. This obligation applies to:

- RAW Repository and RAW storage facilities assigned to Category IV workplaces pursuant to SÚJB Decree No. 307/2002 Coll., and
- workplaces where radiation activities are performed, including the RAW and SF management assigned to Category IV and III workplaces pursuant to SÚJB Decree No. 307/2002 Coll.

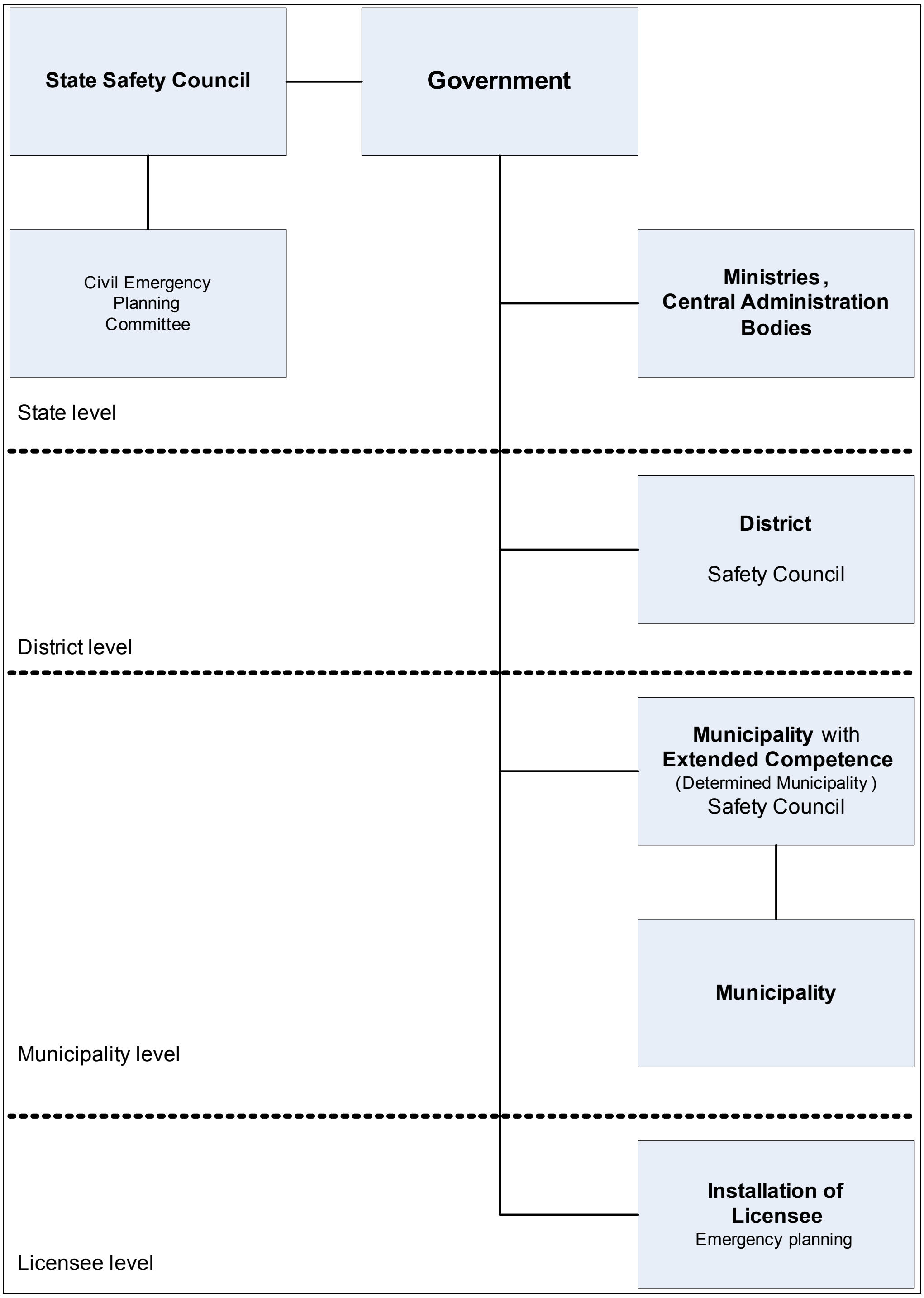

Fig. 6.1 Basic structure of emergency preparedness in the Czech Republic in case of an extraordinary event

The development of emergency preparedness documents in the scope specified above applies specifically to the following licensees:

- ČEZ, a. s. – NPP Dukovany (NI),
  – NPP Temelín (NI),
- SÚRAO – RAW repository Dukovany (NI),
  – RAW repository Richard (NI),
  – RAW repository Bratrství,
- ÚJV Řež a. s. (NI),
- ISOTREND s.r.o. Praha,
- ZAMSERVIS s.r.o. Ostrava,
- WADE, a. s.
- ALLDECO CZ, a. s.

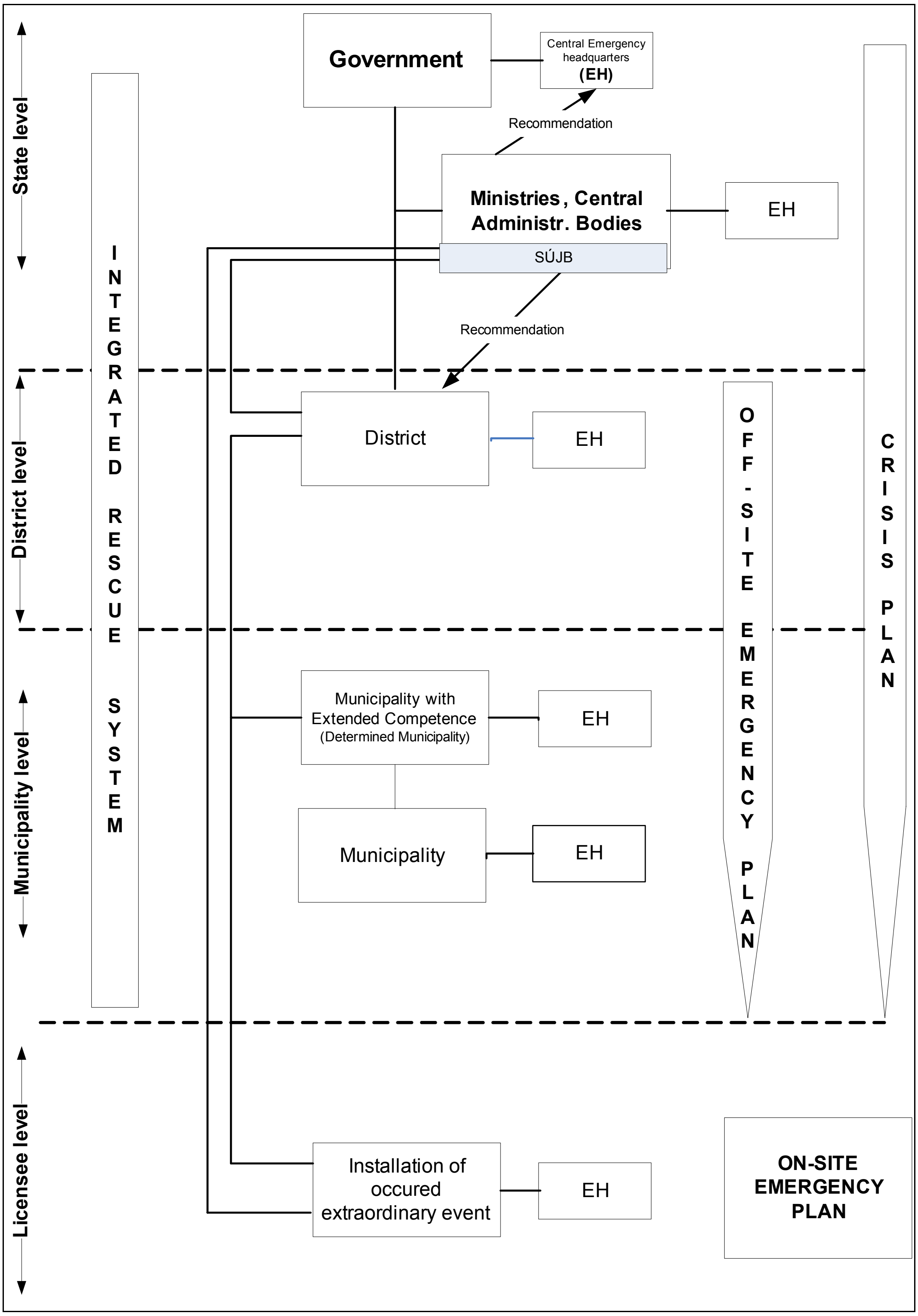

Fig. 6.2 Basic chart of crisis response in the Czech Republic at occurrence of a radiation accident

The requirements for content of an on-site emergency plan are specified by SÚJB Decree No. 318/2002 Coll. (Section 15). The on-site emergency plans shall always contain:

a) an introductory part including
   1. basic data about the licensee,
   2. subject matter and scope of performed activities, including contact data,
   3. place where the activities are performed and their duration,
b) anticipated extraordinary events of the individual degrees, stating methods of their identification under and evaluation of their seriousness,
c) methods and systems to announce extraordinary events,
d) methods to limit exposure of employees and other persons,
e) methods to verify emergency preparedness,
f) intervention procedures ,
g) methods of medical provision of the employees and other persons,
h) methods of data transmittal to the Office,
i) list of state administration bodies and other relevant bodies in agreement with Section (Section) 19 paragraph 1 letter e) of the Act.

Holders of operating licenses for nuclear installations thus prepare their on-site emergency plans to include extraordinary events in the RAW management. For NPP Dukovany, the on-site emergency plan also includes SF management for ISFSF Dukovany. The on-site emergency plan of ÚJV Řež a. s. encompasses its entire site while there are associated emergency plans provided for each building where radiation activities are performed. The requirement for emergency preparedness, including the SF management, applies to the research reactor buildings of LVR–15 and the HLW Storage Facility.

SÚJB shall approve on-site emergency plan documentation; also any change or amendment to such documentation is subject to approval by SÚJB. SÚJB is responsible for supervising of ensuring the emergency preparedness of each licensee, in particular of the approved on-site emergency plan.

6.5.2.4 Off-site Emergency Plans

In compliance with the Act No. 18/1997 Coll. and the Government Order No. 11/1999 Coll., the analyses were performed for the above mentioned NIs to determine the potential for occurrence of radiation accident and the associated impact on the population and environment. These analyses were submitted to SÚJB for review. For NPP Dukovany and NPP Temelín, SÚJB decided to determine emergency planning zones based on the assessment of considered extraordinary events and their consequences in terms of technologies of a nuclear installation designed to generate electric power.

Based on the review of analyses completed for the affected workplaces with RAW or SF management, and the assessment of the considered extraordinary events plus their consequences in terms of the RAW and SF management, and for the RAW repository Dukovany also considering the existing emergency planning zone, no additional emergency planning zones were determined by SÚJB.

For the emergency planning zones of NPP Dukovany and NPP Temelín, the off-site emergency plans were prepared (in compliance with the Act No. 18/1997 Coll., and the Act No. 239/2000 Coll., and the Act No. 240/2000 Coll., and Decree by the Ministry of the Interior No. 328/2001 Coll.) by the relevant regional offices in cooperation with municipal offices with extended powers whose jurisdictions overlap with the emergency planning zones.

Off-site emergency plans are in agreement with the requirements of the Decree by Ministry of the Interior No. 328/2001 Coll. divided into:

A. Information part,
B. Operational part
C. Plans of specific activities

The information part includes:

a) general characteristics of the nuclear installation or workplace with a very significant source of ionizing radiation,
b) characterization of the location, particularly in terms of demography, geography, climate and description of the infrastructure on the location,
c) list of municipalities, including their populations, and list of legal and natural persons conducting business covered by the off-site emergency plans,
d) results of analyses of potential radiation accidents and radiological consequences for population, animals and the environment,
e) system of classification of radiation accidents according to the on-site emergency plan,
f) requirements for protection of population and the environment in respect to intervention levels during a radiation accident,
g) description of structure of emergency preparedness organization in the emergency planning zone, including specification of competencies of its individual units to perform necessary activities,
h) description of a notification and warning system, which contains links to the licensee and communication of information within the emergency preparedness organization in the emergency planning zone.

The operational part contains a summary of planned measures to be performed after a notification about a suspected radiation accident or confirmation of a radiation accident by the licensee.

The operational part includes:

a) tasks of the concerned administration authorities, municipalities and bodies,
b) method of coordination in radiation accident management,
c) criteria to declare corresponding crisis situations provided the off-site emergency plan is obviously not sufficient to deal with the radiation accident,
d) method to assure information flows when managing removal of radiation accident consequences,
e) principles for activities in case the radiation accident consequences spread or may spread beyond the emergency planning zone and for cooperation of the concerned administration authorities and municipalities,
f) forms, methods and procedures to provide information to the population in the emergency planning zone about:

- the nature of potential threat,
- the planned measures to protect the population,
- the actual threat of the population and subsequently adopted measures to protect the population.

The plans of specific activities establish procedures for introduction of individual measures in the following areas:

1. notification,
2. warning to population,
3. interventions by units of the integrated rescue system,
4. population sheltering,
5. iodine prophylaxis,
6. evacuation of persons,
7. individual protection of persons,
8. decontamination,
9. monitoring,
10. regulation of movement of persons and vehicles,
11. medical care,
12. protection of livestock,
13. regulation of distribution and consumption of food, animal feed and water,
14. measures in case of fatalities in a contaminated area,
15. assurance of public order and security,
16. communication with public and media.

6.5.2.5 SÚJB Response to Extraordinary Event

In compliance with provisions of the Atomic Act for occurrence of a radiation incident or accident, SÚJB shall support the activity of ERC, manage activities of the National Radiation Monitoring Network and function as its headquarters. In compliance with provisions of the Crisis Act, ERC is the crisis management center, i.e. it also provides support for the activity of the Crisis Staff including the contact point service intended to be continuously receiving and passing information on the occurrence of a radiation incident or accident.

For any occurrence of extraordinary event, the Crisis Staff activity at the ERC workplace shall be focused to:

- evaluate and forecast the development of technology conditions in conjunction with the measures being implemented by operators of the nuclear installation, including detection of the source term for radioactive leaks into the environment, based on the data and information provided from the nuclear installation and using the technical equipment and methodology or program tools,
- evaluate the performance of on-site emergency plans,
- evaluate the radiation situation of the nuclear installation based on the data and information provided and using the technical equipment and methodology or program tools,
- co-operation with Czech Hydrometeorological Institute to forecast spreading of radioactive materials from the source of radiation accident, and provide information on the potential

exposure in the vicinity of the nuclear installation based on the weather situation and its predicted progress, including specification and clarification of possible levels of the radiation situation based on the information on radioactive leaks from the nuclear installation,

- specify the source term of radioactive leaks and the range of affected area based on the data and information achieved by monitoring of the radiation situation using the teledosimetric systems of the nuclear installation, mobile groups in the vicinity of the nuclear installation, aircraft groups, or any other activated components of the Radiation Monitoring Network while using the technical equipment, and methodology or program tools,
- provide the basis for determination of protective measures for the population and environment in the emergency planning zone of the nuclear installation, and provide the information and messages on the occurrence and development of the radiation accident, including any information on the radiation situation, and the measures being implemented to protect the population and environment, or revocation of those measures for the relevant crisis staff, safety board, and if applicable, the Government, or other state administration bodies, and the public,
- report to the IAEA as stated under the Convention on early notification of a nuclear accidents and Convention on assistance in the case of a nuclear accident or radiological emergency , and the contact points of other countries based on the international bilateral agreements in force.

6.5.2.6 Training and Drills

NIs and workplaces where radiation activities are performed shall develop theoretical and practical training plans for their personnel and other individuals or components to handle extraordinary events of each level.

Emergency drills are performed based on a plan of emergency drills which specifies the focus, scope and dates of drills and, if applicable, their frequency. The plan of emergency drills is developed for each calendar year and by the end of the preceding calendar year the plan is submitted to SÚJB.

The plan of emergency drills to verify activities under the emergency plan and intervention instructions concentrates on practicing of the following activities:

- drill of intervention procedures or intervention instructions for extraordinary events of level one or two, which is performed once a year,
- drill of intervention procedures and related intervention instructions for an extraordinary event of level three, which is performed at least once in two years.

Each emergency drill consists of preparatory, implementation and evaluation stages.

The preparatory stage uses the plan of emergency drill as a basis and results in an emergency drill scenario, which specifies:

- objective, scope and duration of the drill,
- identification of occurrence and type of the extraordinary event and its development in the course of the drill,

- specification of intervention procedures and instructions to be practiced,
- specification of evaluators and observers of the drill.

The implementation stage means execution of the drill in agreement with the previously prepared scenario of the emergency drill, in presence of all persons managing and performing the intervention, including evaluators or, if applicable, observers of the drill.

In conclusion the drill is evaluated and the results are summarized in a final report.

For each calendar year a summary evaluation is performed of completed emergency drills and submitted to SÚJB. Considering shortcomings identified in the course of the drills the licensee adjusts its technical, organizational and personnel conditions and the on-site emergency plan and intervention instructions.

Emergency preparedness in the emergency planning zone is verified by drills under the off-site emergency plan for an extraordinary event of level three – radiation accident. The drills are prepared by the regional office in cooperation with the licensee. The parties involved in the drills include the licensee, regional office, components of the integrated rescue system (fire brigade, police, and medical service) and other bodies and organizations covered by the off-site emergency plan and SÚJB.

The Czech Republic takes part in international drills organized by IAEA (CONVEX), NEA OECD (INEX), NATO (CMX), and others.

6.5.2.7 Supervision by SÚJB

SÚJB is responsible to perform supervision of the licensees in order to determine the state of emergency preparedness in compliance with the Act 18/1997 Coll. as amended, and the Act No. 552/1991 Coll. as amended later. The supervision of this area is focused on:

- applicability of the on-site emergency plans approved by SÚJB,
- intervention instructions in place, their mutual link and relationship to the intervention procedures stipulated in the on-site emergency plans,
- theoretical and practical training level of the personnel and other individuals to handle extraordinary events,
- theoretical and practical training level of the individuals determined in the on-site emergency plans to manage and perform interventions to handle extraordinary events,
- observance of the emergency training plans,
- performance and documentation of the functionality testing on the technical equipment, systems and devices necessary to control and perform interventions at a nuclear installation or a workplace where radiation activities are performed,
- contracting of other individuals required to perform the intervention or activity to handle an extraordinary event as listed in the on-site emergency plan.

In addition to this supervision, SÚJB is also responsible for supervision of emergency drills monitoring scenarios of occurrence and development of a simulated extraordinary event, activities in management and performance of interventions under the on-site emergency plan and the associated intervention instructions.

6.6 Decommissioning

Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility. Such steps shall ensure that:

(i) Qualified staff and adequate financial resources are available;
(ii) The provisions of Article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied;
(iii) The provisions of Article 25 with respect to emergency preparedness are applied; and
(iv) Records of information important to decommissioning are kept.

6.6.1 Summary of National Law for Decommission

Decommissioning of NIs in the Czech Republic is regulated by the Atomic Act 18/1997 Coll. as amended and its implementing regulation issued by SÚJB No. 185/2003 Coll., on decommissioning of nuclear installations and workplaces in categories III or IV, as well as the SÚJB Decree No. 307/2002 Coll., on radiation protection.

According to the Atomic Act 18/1997 Coll. as amended, decommissioning of a NI is one of the activities associated to utilization of nuclear power, and decommissioning is defined as a set of activities aimed to clear nuclear installations or workplaces where radiation activities were performed to be used for other purposes.

The Atomic Act18/1997 Coll. as amended, Chapter three sets forth the conditions for utilization of nuclear power and ionizing radiation in respect to the activities associated with utilization of nuclear power. In Section 9, this condition means a license issued to an applicant by SÚJB based on its competency defined under Section 3 thereunder. As stated in Section 3, SÚJB shall also approve the documentation required by this Act for the particular license applications. The license shall be issued for each stage of decommissioning of a nuclear installation as stated under Section 9, paragraph 1, letter g) in the scope and manner set forth in the implementing regulation, which is SÚJB Decree No. 185/2003 Coll.

The preparation for decommissioning shall be included in each stage of lifecycle of a nuclear installation. The siting license documentation for a NI shall include as Stage 1 of decommission within the Initial Safety Report a draft concept for safe termination of the operation. The licensing documentation for construction of a NI shall include as part of the Preliminary Safety Report the method for safe decommissioning of the installation or workplace being licensed, including disposal of RAW. The licensing documentation for each commissioning stage of a NI for the initial fuel load shall also include the proposed method of decommissioning approved by the Office, as well as the estimated costs of decommissioning verified by SÚRAO. The operating license documentation for a NI shall include the proposed method of decommissioning approved by SÚJB, as well as the estimated costs of decommissioning verified by SÚRAO. The scope and method used to realize the proposed method of decommission as approved by SÚJB are specified under the presently effective SÚJB Decree No. 185/2003 Coll.

The evaluation of environmental effects of decommissioning shall be a prerequisite for issue of the decommissioning license if stipulated under a special regulation (Act No. 100/2001 Coll., on the environmental impact assessment and amendment to some of the associated laws). The applicant shall be obligated to submit the required documentation as part of the decommissioning license application. The binding contents of the license documentation for each stage of decommissioning of a nuclear installation are provided in an Annex to this Act.

The decommissioning license documentation to be approved by SÚJB shall comprise the RAW management specifications for the process of decommissioning, the scope and method of measurement, and the evaluation of personal exposure and contamination of the workplace plus its vicinity with radionuclides and ionizing radiation, and the on-site emergency plan. In the event that RAW would be originated while decommissioning, the application shall be documented as per Section 13 of the Atomic Act 18/1997 Coll. as amended with a provision for the safe RAW management, including funding of this management. The approved Quality Assurance Program shall be another prerequisite for issue of the decommissioning license. The licensee shall submit to SÚJB for approval the decommissioning programs specified under the license.

For decommissioning of a nuclear installation, the holder of the operating license is liable under the provisions of Atomic Act 18/1997 Coll. as amended, Section 18, and based on the estimated total cost of decommissioning, as verified by SÚRAO, to steadily create a provision so that monetary funds deposited on a blocked account are available for the preparation and execution of decommissioning in a timely manner and in a sufficient amount in compliance with the decommissioning proposal approved by SÚJB. Decree No. 360/2002 Coll. stipulates the method of creating the provision for decommissioning of a nuclear installation or workplace in category III or IV. The funds kept on a blocked account shall only be used for the preparation and execution of decommissioning and drawing on such money is subject to approval by SÚRAO.

This Act also defines exceptions to the obligation to create the provision, specifically state organizations, public universities or local government bodies, where decommissioning costs shall be born by the state.

Provisions created by holders of operating licenses for decommissioning of their installations shall be supervised and drawing on the provisions shall be approved by SÚRAO, which has been set up by the Ministry of Industry and Trade as a state organization to perform the activities associated with disposal of RAW.

Details of and requirements for the method and scope of decommissioning and radiation protection assurance in the course of decommissioning of nuclear installations are specified in the following implementing regulations of the Atomic Act 18/1997 Coll. as amended:

- SÚJB Decree No. 185/2003 Coll., on decommissioning of nuclear installations and workplaces in categories III or IV, and
- SÚJB Decree No. 307/2002 Coll., on radiation protection.

6.6.2 Supervision

The license for each decommissioning stage of a NI and approval of the required documentation using the appropriate administration proceedings, as per Section 9, paragraph 1, letter g) of the Atomic Act 18/1997 Coll. as amended, shall be preceded by an on-site inspection. Prior to approval of the method proposed for decommissioning of a nuclear installation, the supervision shall cover the approval process for each decommissioning stage of the nuclear installation, as per Section 9, paragraph 1, letter c), and for operation of the nuclear installation, as per Section 9, paragraph 1, letter d).

Decommissioning of NI is supervised by SÚJB radiation protection inspectors. There are 2 inspectors of the headquarters in Prague earmarked for the task. Other inspectors of radiation protection or nuclear safety from the SÚJB headquarters, as well as inspectors of the SÚJB regional centers, may get involved on as-needed basis and based on the required qualification.

The supervision shall be performed within the scope of SÚJB competence to perform supervision, as set forth under the Atomic Act 18/1997 Coll. as amended and based on internal SÚJB guidelines.

In the process of nuclear installation decommissioning SÚJB inspectors from the SÚJB headquarters, regional centers and local inspectors will mutually cooperate. Also, continual supervision by local NPP inspectors is foreseen during decommissioning similar to that during the commissioning and operation of such installations.

7. Safe Management of SF – Joint Convention, Articles 4 - 10

7.1 General Safety Requirements

Each Contracting Party shall take the appropriate steps to ensure that at all stages of spent fuel management, individuals, society and the environment are adequately protected against radiological hazards. In doing so, each Contracting Party shall take the appropriate steps to:

(i) ensure that criticality and removal of residual heat generated during spent fuel management are adequately addressed;
(ii) ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable, consistent with the type of fuel cycle policy adopted;
(iii) take into account interdependencies among the different steps in spent fuel management;
(iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;
(v) take into account the biological, chemical and other hazards that may be associated with spent fuel management;
(vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;
(vii) aim to avoid imposing undue burdens on future generations.

The general safety requirements are incorporated in the supreme law, that is the Atomic Act of the Czech Republic. Chapter two of this Act regulates the general conditions for performance of activities associated with utilization of nuclear power. The Atomic Act, Section 4, paragraph 3 clearly stipulates that:

"Whoever performs activities related to nuclear energy utilization or radiation practices shall proceed in such a manner that nuclear safety and radiation protection are ensured as a matter of priority."

This principle is then reflected in all implementing regulations associated with the Atomic Act in the Czech legal framework to detail the basic requirements contained in the Atomic Act. The decrees are generally binding regulations and their observation is mandatory for any person who performs or provides support for activities associated with utilization of nuclear power, that is designers, manufacturers, or operators, as well as the regulatory bodies.

The basic safety requirements for commissioning and operation of any NI are given under Decree No. 106/1998 Coll., on the provision for nuclear safety and radiation protection of nuclear installations during their commissioning and operation.

The detailed regulatory requirements for subcriticality and heat sink under the SF management are given under Section 47 of Decree No. 195/1999 Coll., on the requirements for nuclear installations to provide for nuclear safety, radiation protection, and emergency preparedness, which stipulates that:

„The installation for the management of the irradiated and spent nuclear fuel and its storage, and for the handling and storing the other substances containing the fissile products and radioactive substances shall be designed so that it may be possible

a) to prevent with margin the achievement of criticality even under conditions of the most effective deceleration of neutrons (optimum moderation) by area arrangement or by other physical means and procedures, and thus prevent
   1. the exceeding the 0.95 value of effective neutron multiplication coefficient under the assumed accident situations (including the flooding by water),
   2. the exceeding the 0.98 value of effective neutron multiplication coefficient under the conditions of optimum moderation,
b) to assure the adequate residual heat removal under normal and abnormal operations and under accident conditions,
c) to assure the capability for performance of periodic inspections and tests,
d) to prevent the fall of irradiated fuel during the transport,
e) to reduce to the minimum the possibility of fuel damage, i.e. namely to prevent the exposure of irradiated element or fuel assembly to the non-allowable load during the handling,
f) to prevent the fall of heavy objects on the fuel assembly, i.e. the objects with the mass greater than the mass of fuel assembly,
g) to enable storage of damaged fuel elements or damaged fuel assemblies at the constructions and operational units, the part of which is a nuclear reactor,
h) to assure the radiation protection of nuclear installation personnel,
i) for wet storage with a water charge to assure
   1. the check-up of chemical composition and of radioactivity of all water, inside of which the irradiated fuel is stored or in which there is handling of it,
   2. the monitoring and controlling the height of water level in the spent fuel pool and the leakage detection.“

The RAW generated from SF management shall be minimized by the technology / process of storage. For NPP Dukovany, the residual contamination from decontamination of the packaging surface prior to transport from HVB to ISFSF Dukovany is the only potential source for liquid and solid RAW. The residual contamination may only be released from the packaging surface in ISFSF Dukovany during periodical cask treatment / cleaning where radionuclides may be transported to cleaning solutions, detergents, or the protective aids of the personnel.

In case that SF will be declared by the generator or by the Office as RAW and subsequently disposed in DGR the activity shall be also regulated by the legislation relating to disposal of RAW in the underground (at present Act No. 44/1988 Coll. and Act No. 61/1988 Coll., as amended later).

The relationship between different stages of the SF management were already considered in the Policy (see Chapter 2.2) whereas all key stages of the SF management are defined under the Atomic Act, or its implementing regulations. The activities as currently being implemented cover all stages of the SF management through its storage. SÚRAO was established in 1998 as the state organization to provide for activities associated with disposal of RAW, i.e. also for activities relating to conditioning of SF into a form suitable for disposal and for activities associated with sitting, construction, commissioning, operation and closure of repository systems.

The protection for individuals, society and environment against radiological hazard associated with the SF management on the territory of the Czech Republic is defined, in particular under the Atomic Act and Decree No. 307/2002 Coll., on the radiation protection. In compliance with the international recommendations and the law of the European Community, this Decree stipulates the exposure limits (general limits, radiation personnel limits and limits for apprentices and students), derived limits and authorized limits of exposure.

Any potential impact on the environment, that is even any biological or chemical hazard possibly related to the SF management, shall also be reviewed and evaluated in the process of review of the plan effect as stipulated by the Act No. 100/2001 Coll., on the review of environmental effects. Annex 1 to this Act No. 100/2001 Coll. classifies *„The installations designed for processing of spent or irradiated nuclear fuel or highly active radioactive wastes"* as Category I, Number 3.4 (plans subject to review at all times).

Any activities performed to manage SF shall be aimed to minimize the burden incurred to the future generations due to such activities. These efforts are also conveyed as one of the basic principles of the Policy. While some activities shall be continued even in the remote future such as development, construction and operation of the deep geological repository (DGR), there are prerequisites for such activities to be successfully continued. That is primarily the financial and institutional provision for such activities regulated under the Czech law.

7.2 Existing Installations

Each Contracting Party shall in due course take the appropriate steps to review the safety of any radioactive waste management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility.

7.2.1 Nuclear Power Plant Dukovany

At the NPP Dukovany site, SF is generated from operation of four VVER 440/213 reactors. These light-water reactors are operated in refueling cycles. Once a year, each reactor unit is shut down for planned refueling outage and equipment review. During the refueling outage, some of the SF assemblies of VVER 440 having worked the required number of cycles are removed from the reactor core to the adjacent SF pool located in the reactor hall (one SF pool pertains to each reactor). The annual generation of SF per reactor unit is approximately 10 t HM. The SF is stored in the SF pools for five years at least to be consequently loaded into the type approved transport and storage cask CASTOR-440/84.

Each VVER 440/213 reactor zone contains total of 349 FAs of which 312 are working assemblies and 37 are control assemblies.

A description of FAs used in VVER 440/213 reactors are provided in the National Report by the Czech Republic under the Joint Convention, Revision 1.1, of February 2003.

7.2.1.1 SF pools

The FAs are stored in SF pool using a compact rack with capacity of 682 FAs. This compact rack with three sections is composed of hexagonal pipes made from the special material ATABOR containing boron. The lower part of each pipe is welded to the support plate while the upper part is welded tight. The entire bundle of pipes is tightened with a flanging frame. The sections are connected to the support plate using pins.

The SF pool also contains total of 17 hermetically sealed cases designed for storage of damaged fuel.

For complete fuel unload from the reactor performed regularly once in four years in order to inspect the reactor pressure vessel and reactor internals, an „auxiliary rack“ with capacity of 350 points may be installed in the SF pool to provide for temporary storage of such removed fuel assemblies.

SF pool is filled with water containing boric acid solution of the min. concentration 12 g/kg. The minimum water level in the pool shall be 14.45 m when fuel is stored in the compact rack or 18.5 m when fuel is stored in the auxiliary rack. These levels provide a sufficient layer of water to catch any possible release of iodine from the damaged fuel assemblies, as well as to protect the personnel against SF radiation.

The decay heat is removed from FA using the cooling system of the SF pool. This system was designed with two stand-alone circuits where each of those was dimensioned for the maximum design heat load under complete fuel unload, that is 8.14 MW (by the type of used fuel, the actual heat load of the SF pool shall not exceed 4 MW even under emergency removal of all fuel from the reactor and the lower storage rack filled with the previously removed fuel). Under normal operation of the system, one circuit is working and the other one is used as stand-by. Removed heat goes through a system exchanger to the cooling circuit of the essential service water.

7.2.1.2 ISFSF Dukovany

The building of ISFSF Dukovany provides for the following basic storage functions:

- provide storage of 60 pcs of CASTOR-440/84 casks containing SF,
- remove casks using a crane,
- reduce to minimum the radiation exposure outside of the building well below the permitted values,
- provide cooling of the stored casks and decay heat sink to the environment using natural aeration,
- create working conditions for the personnel of ISFSF Dukovany,
- possibility to perform inspections and minor repairs of casks,
- protection against weather effects,
- in conjunction with the physical protection system it prevents unauthorized access, and
- provide shielding from solar radiation.

ISFSF Dukovany basic specifications:

Equipment supplier	GNS/NUKEM Consortium of Alzenau, Germany
Construction start date	06/1994
Construction end date	07/1995
Commissioning	12/1995
Facility length	56 m
Facility width	28 m
Facility height	20 m
Capacity	600 t HM.

The basic element of ISFSF Dukovany is CASTOR-440/84 cask. It is used for transport and storage of 84 hexagonal SF assemblies from a VVER 440 reactor. In the cask, SF assemblies are stored dry in the environment filled with inert gas – He. For the operation of ISFSF Dukovany, the cask is primarily used for storage, the transport function is only used to carry the cask to/from ISFSF Dukovany. In the Czech Republic, this cask has a type approval for transport and storage of SF.

The actual structure of CASTOR-440/84 cask provides for the following functions:

- reduces the gamma dose rate from SF on the packaging surface,
- reduces the dose rate equivalent from neutrons on the packaging surface,
- prevents radioactive leak from the inside space of the packaging,
- maintains fuel subcriticality,
- provides for fuel decay heat sink.

These functions of CASTOR-440/84 casks are provided during transport, storage as well as during design basis accidents.

A CASTOR-440/84 cask consists of a thick-walled cylindrical body with a bottom, provided with a double head closing system in the upper part plus a built-in structure to store a fuel assembly. The radial ribs on the outside of the cask envelope are to extend the heat transfer surface.

Fig. 7.1 ISFSF Dukovany Storage Hall

For the purpose of transport and handling, the cask contains 2 pairs of trunnions and removable shock absorber and for storage a protective plate.

The basic parameters of CASTOR-440/84 cask:

Diameter	2660 mm
Height	4080 mm
Wall thickness	370 mm
Material	cast iron with spheroidal graphite
Loaded cask weight including the protecting shield (exc. shock absorbers)	116 110 kg
Maximum FA heat output	21 kW
Maximum total permitted activity	$2.7x10^{17}$ Bq
Maximum dose rate on the cask surface (the most exposed area)	< 2 mSv/h
Maximum dose rate at the distance of 2 m	< 0.1 mSv/h
Number of fuel assemblies in OS	84 pcs
Maximum initial FA enrichment	3.60 % wt. ^{235}U
Maximum FA burn-up	42 000 MWd/tU
Minimum FA residual heat removal time	60-69 months depending on burnup
Maximum heat output of a single PS	250 W.

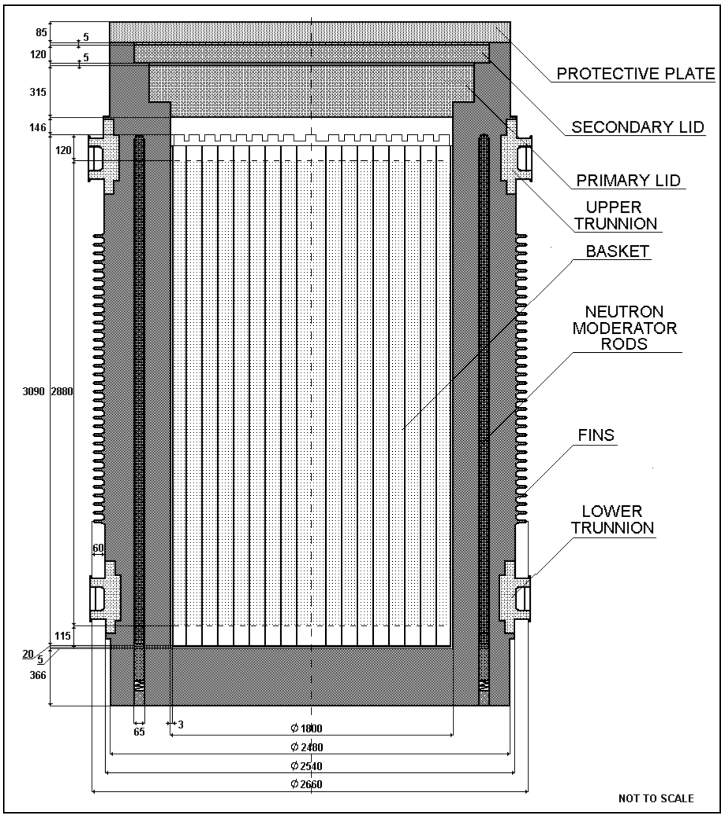

Fig. 7.2 CASTOR-440/84 cask

7.2.2 Nuclear Power Plant Temelín

At the NPP Temelín site, the SF is generated from operation of two VVER 1000/320 reactors. Similar to NPP Dukovany, the reactors are operated in refueling cycles whereas the fuel resides in the reactor for the duration of 4 years.

The core contains 163 FAs and 61 control elements arranged into a hexagonal array. The total weight of a fuel charge is 92 t.

Characteristics of fuel assemblies of VVANTAGE 6 type are provided in the National Report by the Czech Republic under the Joint Convention, Revision 1.1, of February 2003.

7.2.2.1 SF pool

Fuel unload from the reactor and its consequent storage in the pool are performed under water to provide fuel shielding and cooling as needed. Boric acid is solved into water with the concentration kept at 11.44 g/l. The water charge is cooled using three identical cooling circuits which may be interconnected with each circuit dimensioned to cover by itself with a great margin the normal operating heat load of the entire pool (i.e. less the emergency defined core) which may reach up to 2.83 MW_t. The water level above the fuel stored is automatically maintained at the required level using the charging system. The fuel assemblies removed from the reactor are placed into the compact storage rack in the pool. The design and material of the rack shall maintain subcriticality of the stored fuel.

If there is a cladding leak identified during testing of FAs, or fuel rods, the damaged elements are placed into hermetically sealed cases (enclosures). There is one section of the storage rack reserved for cases. If a compact storage rack is used and the reactor is operated in four-year fuel cycles, the size of the SF pool allows to keep fuel in the main unit buildings as long as 12 years from reactor unload. A rack for one unit comprises total of 705 storage positions of which 678 positions are reserved for undamaged FAs, and 25 positions are reserved for enclosures of damaged FAs, or damaged fuel rods, and 2 positions are used to accommodate cluster cases. One section of the storage rack, 163 nests, is always kept on stand-by for outright and complete core unload.

The compact storage rack of SF pool is designed to store spent, both operated and damaged FAs, clusters and cluster capture. The entire rack consists of five sections, each of which comprises two major parts: support plate and absorber part with storage nests. The nests for undamaged FAs are composed of hexagonal absorber tubes made from ATABOR special stainless steel containing 1% of boron. Both tube ends are welded into steel plates making a fuel alignment plate for nests. This solid weldment lies on pillars of the rack support plate. The support plate bears on the bottom of the pools using depth adjustable supports, which allow accurate horizontal alignment of the plate.

Technical parameters of the rack:

FA nests	678
Enclosure nests	25
Cluster case nests	2
FA spacing	288 mm

Enclosure spacing	400 mm
Absorber tube plate thickness:	4.2 mm
Material	stainless steel ATABOR.

The compact storage rack is classified under seismic resistance Category 1.

SF pool also includes a cover used to cover up the pool under operation of the unit. The major functions of this cover are to prevent foreign objects from falling into the pool, protect the operator against the pool radiation, limit water evaporation from the pool, and restrict the spray system water to fall into the pool. The capacity of the cover is 400 kg/m^2 and its classification is seismic resistance Category I.

A removable gate is used to separate SF pool from ŠTK and the reactor cavity. It is used to rise the level in the space to the transport level. The inside diameter of the opening being closed is 1200 mm and the height 7400 mm. The removable gate comprises of a removable slide gate and a built-in supporting frame. The slide gate is equipped with rubber packing and cam mechanism to seal the slide gate down to the frame. The slide gate is withdrawn or inserted using a polar crane in the reactor hall.

7.2.3 ÚJV Řež a. s.

7.2.3.1 Bldg. 211/7 - SF Storage Facility

By the 31 December, 2004, there were 12 pcs of IRT–2M SF assemblies stored in Pool A with the initial enrichment of 80 % wt. ^{235}U plus 51 pcs of SF elements with the initial enrichment of 36 % wt ^{235}U. When the new HLW storage facility was built providing storage of HLW in drums, most of the old experimental devices were disposed to improve water purity.

The following activities were completed during the past few years:

- purification of the pool water in the SF storage facility – water replacement, filtration, filter modification for corrosion product colloids and filter media replacement,
- disposal of contaminated water and filter media and other RAW,
- cleaning and renovation of FA support stands,
- removal of the deposit from the bottom of pools, and its disposal (method, agents and equipment, implementation),
- monitoring of the conditions in pools using the industrial TV.

Water chemistry has been regularly monitored, including:

- determination of content of Cu, Al, Fe, Cl ions,
- determination of the volume activity of gamma ^{137}Cs and other fission products,
- special techniques have been developed to isolate and determine low concentrations of neptunium, uranium, and plutonium, and their isotope composition in nano or subnanogram amounts,
- determination of uranium or transuranium elements using the techniques in the SF storage facility,

- verification of the method used to identify plutonium in the actual samples, that is reactor water, rinsing water from a leaking fuel element and water in the SF storage facility (different sampling levels or sludge).

The scope of supervision was determined by SÚJB in respect to the identified corrosion and leakage of fuel assemblies.

In 1995 accessible places of both Pool A and B were inspected using an underwater camera. A slight corrosion was identified at those points where the anchoring supports placed in concrete are welded on the outside, however, with no impact on the strength or integrity of the pool.

Once the major part of SF was relocated to the new HLW storage facility, the water was drained from Pool A, FA stands were removed, and the pool was thoroughly cleansed and visually inspected in 2000. The inspection determined a very good condition of the pool walls while a light surface corrosion was identified and removed from some points of the walls. There was no damage identified that might result in water leaks from the pool. Once the inspections were completed and Pool A was cleansed, it was filled with clean demineralized water and it allows to maintain the water quality as prescribed for SF storage by the fuel manufacturer. Based on results of this inspection, SF is only to be stored in Pool A prior to transport to the HLW storage facility while Pool B is reserved for storage of the activated parts of probes and loops and HLW.

7.2.3.2 Bldg. 211/8 - HLW Storage Facility

Bldg. 211/8 – HLW storage facility is used for storage of SF from research nuclear reactors and RAW:

- PS EK–10 ,
- PS IRT–M and IRT–2M,
- RAW
- Surveillance and assessment program for RAW, and
- Solid non-standard waste.

RAW is stored fixed in concrete in barrels of 200 liters within storage boxes (II, IV). The waste from the surveillance program is in metal containers in Box I. The non-standard solid RAW is stored in Boxes III. During the refurbishment of the HLW storage facility the boxes VI – VIII have been e provided with a technology to handle EK-10 type fuel.

Box	I.	–	Waste from the surveillance program
Box	II.	–	Barrels with solidified RAW
Box	III.	–	Non-standard wastes
Box	IV.	–	Barrels with solidified RAW
Box	V.	–	Special storage units with FA EK–10
Box	VI.	–	Storage equipment (storage safe)
Box	VII.	–	Hot cell
Box	VIII.	–	Hot cell control room

The basic parameters of IRT–M/IRT–2M FAs are provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1 of February 2003.

FAs IRT–M are covered with a layer of shielding water in the pool (240 pcs in total). FAs EK – 10 are stored dry using special storage units with the final number of 190 pcs and in the wet storage in the pool B (16 pcs.)

7.3 Siting of Proposed Installations

1. Each Contracting Party shall take the appropriate steps to ensure that the following procedures are established and implemented for a proposed radioactive waste management facility:

(i) to evaluate all relevant site-related factors likely to affect the safety of such a facility during it's operating lifetime as well as that of a disposal facility after closure;
(ii) to evaluate the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of the site conditions of disposal facilities after closure;
(iii) to make information on the safety of such a facility available to members of the public;
(iv) to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.

2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 4.

In late 2004 activities were conducted on the Czech Republic's territory associated with prospective siting of a new SF storage facility in Temelín with the capacity of 1370 t HM. Considering the capacity of SF pools at NPP Temelín it is necessary to open the SF storage facility at NPP Temelín in 2014 at the latest.

As a part of the plan preparation a feasibility study was completed in 2002 for siting of a SF storage facility at the NPP Temelín site. Taking into account the favorable experience ČEZ, a. s. gained in NPP Dukovany with the dry storage technology for SF in packagings for transport and storage, the storage technology for SF from NPP Temelín will be similar. It is assumed that the SF will be first stored in SF pools to reduce its decay power and then relocated under water from SF pools to cask located in ŠTK. Full cask will be subsequently dried in the reactor hall, evacuated, filled with helium and hermetically sealed. This will be followed by prescribed dosimetric measurements. Then the cask will be dropped in a transport corridor to a special railway car container. According to the Policy, the expected storage time should be around 60 years.

The preparations for construction of SFSF Temelín follows the Government Decree No. 121/1997 of 5 March, 1997 in which the Czech Government recommended to build SF storage facilities at the sites of the operated NPPs. The advantage of this solution is elimination of SF transport outside the NPP site and utilization of the existing NPP sites without having to intervene into intact landscape. The development of SF storage facility in Temelín also follows the Czech Government resolution No. 487/2002, which approved the Policy for SF and RAW management (see chapter 2.2).

The following key steps have been taken in connection with the development of SFSF Temelín:

- announcement of the plan to site SFSF on the NPP Temelín site to the Ministery of Environment (July 2003),
- development of EIA documents for SFSF Temelín and submission of them to the Ministery of Environment (July 2004),
- development and submittal for review of documents in agreement with EC recommendation 1999/829/Euratom on implementation of Article 37 of Euratom Treaty (February 2005),
- development of the Initial Safety Report in agreement with the requirements of the Atomic Act in connection with the application for siting license and submission of them to the SONS (February 2005),
- development of EIA documents for SFSF Temelín and submitssion of them to Ministery of Environment (2nd quarter of 2005),
- public discussion on the environmental effects of the SFSF Temelín (24 August 2005).

A comprehensive description and assessment of impacts of the project on population and the environment were completed as a part of EIA documents, in compliance with Act No. 100/2001 Coll., on assessment of impacts on the environment. Input data for the analysis included information about the project and required inputs (soil, water, input materials and energy sources, infrastructure requirements) and outputs (atmospheric pollution, effluents, wastes, etc.). The EIA documents also include a summary of non-technical nature, containing brief basic information about the project and conclusions from individual areas of assessment of impacts on individuals, community and the environment. The documents are available to the general public also on the website of the Czech Republic's Ministry of the Environment.

The EIA documents were mailed to municipalities, local government authorities and administration bodies affected by the planned project and, in agreement with article 4 of the Espoo treaty and Section 13 of Act No. 100/2001 Coll., also to the Austrian party. In conformity with article 5 of the Espoo treaty and section 13 of Act No. 100/2001 Coll., the Austrian party was offered a meeting to discuss the issue, which was accepted and the meeting was held in January 2005.

Implementation of the SFSF Temelín will be provided for in a standard manner. An international tender is expected to be open for the storage technology contractor. If ČEZ, a. s. encounters major obstacles which might threaten timely completion of the SFSF Temelín a back-up site in Skalka is available. The Skalka site is about 160 km from the NPP Temelín site, where ground investigations were performed there in the past, including an exploration gallery (an underground dry container storage for SF had been originally planned there). At the moment a valid planning permit is available, however no construction or other activities are under way on the site, just guarding, public and institutional excursions and observation of long term geologic parameters.

7.4 Installation Design and Construction

Each Contracting Party shall take the appropriate steps to ensure that:

(i) the design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;

(ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a radioactive waste management facility other than a disposal facility are taken into account;

(iii) the technologies incorporated in the design and construction of a radioactive waste management facility are supported by experience, testing or analysis.

At present only one SF management installation is under construction in the Czech Republic - SFSF Dukovany at the NPP Dukovany site with the capacity 1340 t HM. Due to the limited capacity of the existing ISFSF Dukovany the facility shall be in operation by 2006. The storage capacity of SFSF Dukovany will be sufficient for all SF from NPP Dukovany once the operated ISFSF Dukovany is full and until decommissioning of all the four units of NPP Dukovany.

The safety for stored SF in the planned SFSF Dukovany is based on the properties of dual-purpose casks the structure of which meets all of the safety criteria. SFSF Dukovany will only be used for the casks with a B(U) or S type approval for cask in accordance with the Atomic Act, or the successive SÚJB Decree No. 317/2002 Coll. The CASTOR-440/84M cask supplied by the GNS Essen company will be used for the initial operation of SFSF Dukovany.

The SFSF building, including the shielding concrete wall provides an additional protective function. The ALARA principles were applied to the design of OS, as well as to the building of SFSF Dukovany.

The following key steps have been made in connection with the construction of SFSF Dukovany:

- development of EIA documents for SFSF Dukovany,
- development of an expert opinion for EIA documents for SFSF Dukovany,
- public discussion of environmental impacts of SFSF Dukovany,
- issue of a favorable position by MŽP ČR,
- development of the Initial Safety Report in connection with the application for a siting license,
- issue of a siting license by SÚJB for the SFSF Dukovany at the NPP Dukovany site,
- issue of a planning permit,
- selection of a designer for SFSF Dukovany,
- selection of cask supplier for initial operation of SFSF Dukovany,
- development of a Preliminary Safety Report in connection with the application for a license for construction of SFSF Dukovany,
- issue of a license by SÚJB to construct SFSF Dukovany in the NPP Dukovany site,
- start of construction of SFSF Dukovany (April 2004).

Fig. 7.3 The ISFSF Dukovany (left) and SFSF Dukovany under construction (right)

More detailed information about the Preliminary Safety Report for the SFSF Dukovany is provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1, of February 2003.

The basic SFSF data:

Construction title	Spent Fuel Storage Facility
Construction site	Dukovany
Region	Vysočina (Czech Highlands)
Investor	ČEZ, a. s.
Cask supplier for initial SFSF operation	GNS Essen
Construction supplier	HOCHTIEF VSB, a. s.
Designer	ÚJV Řež a.s., Division Energoprojekt Praha, a. s.
Estimated start date	12/2002
Estimated end date	03/2006.

7.4.1 Personal Exposure Evaluation for SFSF Operation

The evaluation of personal exposure is based on the estimated effective doses from external whole-body exposure of the persons involved in the operation of the storage facility. In order to determine the estimated effective doses, the employees were divided into groups by the nature of their work / performed activity. The number of personnel, as well as demanded time, is based on the design documentation of the SFSF process part. Results of the analysis show that the annual effective dose per person varies between 0.5 – 11 mSv depending on the nature of their work / activity, and the collective dose is estimated around 80 mSv which provides a sufficient margin to ensure, even with a level of uncertainty relevant to the current knowledge, that the guidance value of 1 Sv set for the annual collective effective dose shall not be exceeded.

7.4.2 Evaluation of Radiation Effects on the Environment and Critical Group of Population

The selected process of dry storage implies that external exposure may be the only potential route of exposure for the environment or the population. The shielding concrete wall around the storage area of SFSF is designed as the radiation shield. The wall thickness of 50 cm was selected as the optimizing method to make sure that the dose rate equivalent is less than 2.5 μSv/h.

Due to the fact that dose rate is rapidly dropping with distance from the source, a sufficiently conservative estimate may envisage the effective dose rate from the storage facility to be about 10^{-9} Sv/h or less in any other area of the NPP site. This estimate was based on the drop of the photon and neutron radiation flow with distance from its source. It implies that the effective dose contribution of the storage facility for any person working on the site or within its protection zone will be less than 2 μSv/y, and the effective dose rate contribution of the storage facility on the fence of NPP will be considerably less than 100 μSv/y.

For the critical group of population represented by citizens of the nearest municipalities about 3 km away from the considered source, the effective dose rate estimate may be at the level about 10^{-17} Sv/h, and the resulting effective dose about 10^{-13} Sv/y It is evident that the dose rate contribution of the storage facility as a source of ionizing radiation is well insignificant and much lower than the contribution of natural sources, as well as considerably lower than the regulatory limits and guidance values of exposure.

7.4.3 Radiation Monitoring

SFSF Dukovany is a NI by wording of the Act No. 18/1997 Coll. The scope and method used for radiation monitoring of SFSF Dukovany is such that all obligations imposed on the holder of license for utilization of a nuclear installation are met.

The design of radiation monitoring shall cover the following:

- workplace monitoring,
- personal monitoring,
- effluents monitoring, and
- environmental monitoring.

The radiation monitoring system will be similar to the existing ISFSF Dukovany. Additionally to the above system, SFSF Dukovany is planning to use the so called radiation monitors of the airstreams from the cask drying system in the reactor units aimed to control FA leak tightness in the course of cask drying, and also monitoring of the released airstreams in terms of radiation. The airstream radiation monitor will be used to detect noble gases (^{85}Kr) and aerosols (^{134}Cs, ^{137}Cs, ^{144}Ce, ^{139}Ce, ^{106}Ru, ^{60}Co, ^{58}Co, ^{54}Mn, ^{110m}Ag) in the airstream.

The existing environmental radiation monitoring system of NPP Dukovany providing for monitoring of all components of the environment shall be used in full scope to monitor the ambient environment. The construction of SFSF Dukovany will not affect the scope and number of the environmental radiation measurements outside of NPP Dukovany. On the site, SFSF

Dukovany may only affect the number or location of environmental sampling points during construction and during SFSF operation.

7.4.4 Emergency preparedness

Any emergency situation in the planned SFSF Dukovany shall be dealt with using the emergency preparedness system of NPP Dukovany which is described in detail in the National Report of the Czech Republic under the Convention on Nuclear Safety, Chapter 11, prepared in September 2001, or in Chapter 6.5 of this Report.

7.4.5 Safe Decommissioning

In accordance with the Atomic Act, a draft concept for safe decommissioning, including RAW disposal, shall be part of the licensing documentation for construction of SFSF Dukovany. The method and scope of decommission are set forth in the implementing Decree No. 185/2003 Coll., on decommissioning of nuclear installations and workplaces in categories III or IV.

The SF shall be kept safe in SFSF Dukovany until classified as RAW in compliance with the Atomic Act. Then it shall be forwarded to SÚRAO for safe disposal in compliance with the Policy in force.

The decommissioning concept of SFSF Dukovany is strongly affected by the selected fuel storage technique. SFSF Dukovany is a surface storage facility with dry storage using casks, where the major function in SF storage is performed by the cask itself. It is a highly safe storage technique with minimum generation of operating wastes of which the majority shows radioactivity values permissible to be discharged into the environment.

The decommissioning of SFSF Dukovany shall be preceded by removal of all SF casks from the storage facility, and clearance of the operating, liquid, or solid wastes, including radioactive, hazardous, or toxic wastes, and elimination of any identified contamination on the technological or construction surfaces, and providing the documents required to revoke the controlled area and the radiation monitoring system, and providing the data as necessary to amend the emergency plan and physical protection on the site of NPP Dukovany. No contaminated material, or contaminated equipment, or contaminated civil structure shall remain in the storage facility after decommissioning of SFSF Dukovany.

No decontamination work is envisaged for the decommissioning process of SFSF Dukovany. RAW generation is not anticipated due to the above described concept of decommissioning. No dismantling or demolition work is envisaged since the storage building is planned to be used for storage and handling needed for decommissioning of NPP Dukovany.

The essential decommissioning activities for SFSF Dukovany shall include control radiation monitoring, updates of the existing documentation, and preparation of the documentation needed for exclusion of the construction from the scope of the Atomic Act. The decommissioning shall encompass the final measurements and radiation assessment of the overall SFSF site to be used as the basis for evidence that the level of surface contamination on any parts of SFSF Dukovany is kept within the limits prescribed for unlimited use or, if applicable, for unlimited discharge into the environment of materials defined under the implementing regulation of SÚJB.

7.5 Assessment of Safety of Facilities

Each Contracting Party shall take the appropriate steps to ensure that:

(i) before construction of a spent fuel management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;

(ii) before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

7.5.1 Nuclear Power Plant Dukovany

7.5.1.1 SF Pools

The SF pools in the main production building are partial technological units within these operating units and therefore their safety has not been analyzed separately but as part of safety reports for the reactor units.

In NPP Dukovany safety reports have been developed separately for reactor units (which also include SF pools) and ISFSF Dukovany.

Based on a resolution by ČSKAE No. 154/1991 and other SÚJB requirements and general international recommendations a safety report was elaborated for EDU in 1994, which in a comprehensive manner documented the satisfactory status of nuclear safety assurance at EDU production units. The report is called Operational Safety Report for EDU Unit 1 and is based on the original Pre-operational Safety Report for EDU and its numerous amendments. The safety report structure follows, based on a SÚJB recommendation, the document "Typical content of technical substantiation of safety - safety report - nuclear power plants", published in “Safety of Nuclear Installations No. 5/1988”. Based on the documents SÚJB issued its Decision No. 197/95 (license to operate Unit 1 after ten years) on 21 August 1995

Subsequently, other parts of the Operational Safety Report were developed, specific for Units 2, 3 and 4 at EDU, and reviewed by SÚJB to issue licenses for their operation. Considering the terminology used in the new Czech legislation the Operational Safety Report was, on SÚJB request, in 1998 renamed and as part of regular updating submitted to SÚJB identified as Pre-operational Safety Report for EDU, Revision 1.

At the moment works have been under way to modify the safety report in agreement with US NRC RG1.70, which is now an internationally recognized standard for safety reports. The safety report will serve as an input document to grant another 10-years license to operate EDU reactor units after 2005.

A brief summary of extraordinary events in SF pools, as evaluated by EDU safety documents, is provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1, of February 2003.

7.5.1.2 ISFSF Dukovany

The Pre-operational Safety Report, Revision No. 1 from July 1995, was one of the main supporting documents for SÚJB approval for trial operation of ISFSF Dukovany. The approval was provided in the SÚJB Resolution No. 245/95 of 24 November 1995.

Revision No. 2 of the above-mentioned report followed in September 1996; it was reviewed, including other necessary documents, and SÚJB issued Resolution No. 29/97 of 23 January 1997 permitting permanent operation of ISFSF Dukovany.

At the moment, Revision No. 3 has been in effect for ISFSF Dukovany of the Pre-operational Safety Report from January 2000, which was one of the supporting documents to issue the SÚJB resolution permitting to extend the operation of ISFSF Dukovany until 31 December 2010.

7.5.2 Nuclear Power Plant Temelín

Identically as in case of NPP Dukovany the SF pools are part of the main production building and therefore their safety has been evaluated within the safety documents for the entire NPP Temelín.

A brief summary of analyses, developed as a part of the Pre-operational Safety Report for NPP Temelín in connection with the operation of SF pool, is provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1, of February 2003.

7.5.3 ÚJV Řež a. s.

7.5.3.1 Building 211/7 - SF Storage Facility

The safety evaluation has been performed in the Pre-operational Safety report for LVR – 15 reactor, Reg. No. ÚJV 11783 T of June 2002. The wet accumulator tank and pool A in the facility has been used to store irradiated fuel for the decay period, before it is moved into the high-level waste storage facility. Both in the accumulator tank and pool A the fuel assemblies are placed in a storage grid which assures undercriticality of the system. The storage environment of the fuel assemblies is demineralized water with the same parameters as prescribed for the primary circuit.

The capacities and grid spacings are as follows:

- Wet accumulator tank for SF
  storage capacity 60 units
  grid spacing 150 x 150 mm
- pool A in the facility
  storage capacity 80 units
  grid spacing 150 x 150 mm

(neighboring units are separated with 0,5 mm thick cadmium plates).

If SF is in the reactor the wet accumulator tank shall have a sufficient number of free units to accommodate the fuel in case of an accident.

For handling and storage of irradiated fuel the requirements specified in Section 47 of Decree 195/1999 Coll. have been met as follows:

- undercriticality is assured by placement of fuel assemblies in stable stands with grid spacing which provides for sufficient undercriticality,
- removal of residual heat in the storage facility is assured with a large volume of water in the pool A and the minimum period of 2 years between the fuel removal from the reactor and transport into a storage facility. Sufficient cooling of fuel assemblies is documented with operational measurements throughout the operation of VVR–S reactor and subsequently, after the reconstruction, of LVR–15 reactor. An auxiliary cooling circuit has been installed in the wet accumulator tank for transport of a big number of irradiated FA from the reactor. The big number means that more than four fuel assemblies need replacement or a handling needs to be performed in the core which requires to evacuate a part of the core,
- aids to handle packagings for fuel transport are regularly inspected before any transport of fuel assemblies. The crane in the reactor hall is regularly inspected in agreement with regulations for lifting equipment. The inspection of the wet accumulator tank was performed in 1996; the inspection of pool A in the facility was performed in 2000,
- to prevent a fall of SF during transport and to reduce its possible damage during handling the workers strictly follow the Program for transport, storage and handling of fuel for the LVR–15 reactor,
- wet accumulator tank and pool A in the storage facility are provided with lids,
- leaking fuel assemblies are stored in hermetic cases in wet accumulator tank and in the pools in the storage facility,
- radiation protection during SF handling is assured through the radiation protection system for the LVR–15 reactor workplace,
- chemical composition of water and water radioactivity in the storage tanks is checked 1x month. The water level in the wet accumulator tank is measured and transmitted into the reactor operators' room, the water level in the storage facility pools is checked once in 14 days. The water is made up into the tanks via pipes from demineralized water supply tanks on the 2nd gallery in the reactor hall.

7.5.3.2 Building 211/8 - HLW Storage Facility

7.5.3.2.1 HLW Storage Tank

Undercriticality of the HLW storage tank for SF has been verified by a calculation using MCNP 4C program and a set of libraries with effective cross-sections DLC–200 dedicated to the program. The individual calculations anticipate that free space in the tank is evenly filled with water of various density. The HLW storage tank meets the requirement for the system undercriticality. For the tank flooded with water $k_{eff} = 0.459 \pm 0.016$. For the tank in a condition of optimum moderation $k_{eff} = 0.737 \pm 0.017$.

The heat output of the stored SF has been established for storage of SF in the tank B in the high-level waste storage facility, under a layer of shielding water. The overall heat output of the stored SF has been established based on the following conditions and assumptions:

- The output has been established for full utilization of the tank's storage capacity,
- Generated residual heat for each stored fuel assembly has been calculated by the ORIGEN program, version 2.1, for the following anticipated parameters:
  - Fuel IRT – 2M, 4-tube FA, enrichment 36 % wt. ^{235}U, burnup rate 60 % (180 MWd/kg),
  - Fuel IRT – 2M, 4-tube FA, enrichment 80 % wt. ^{235}U, burnup rate 55 % (350 MWd/kg),
  - Fuel EK 10, enrichment 10 % wt. ^{235}U, burnup rate 45 %.

7.5.3.2.2 Storage Equipment in the Facility

A calculation of undercriticality for the newly developed storage installation (storage safe), with the maximum capacity of 7 baskets with EK-10 FAs, was made as a part of documents for reconstruction or other changes affecting nuclear safety, radiation protection, physical protection and emergency preparedness of a nuclear installation or workplace in category III or IV, in respect to the high-level waste storage facility in bldg. 211/8, in agreement with Section 9 paragraph 1 letter f) of Act No. 18/1997 Coll. The calculation was made for seven baskets in the storage safe with 36 hermetic cases in each basket, while one case contains no more than 19 fuel rods from EK-10 FAs. This configuration is optimal in terms of a potential occurrence of criticality. Similarly as in case of the high-level waste storage tank, MCNP 4C program and a set of libraries with effective cross-sections DLC–200 has been used for the calculation. The resulting value was k_{eff} = 0.06195 for the basket and k_{eff} = 0.06776 – 0.07159 for the storage facility, depending on tolerance of the basket wall thickness, boron concentration in the basket material (ATABOR), fuel weight and enrichment and Mg content in the matrix.

The submitted documents also included evaluation of structural integrity of the SF, provision of heat removal and radiation protection.

7.6 Operation of Facilities

Each Contracting Party shall take the appropriate steps to ensure that:

(i) the license to operate a spent fuel management facility is based upon appropriate assessments as specified in Article 8 and is conditional on the completion of a commissioning program demonstrating that the facility, as constructed, is consistent with design and safety requirements;

(ii) operational limits and conditions derived from tests, operational experience and the assessments, as specified in Article 8, are defined and revised as necessary;

(iii) operation, maintenance, monitoring, inspection and testing of a spent fuel management facility are conducted in accordance with established procedures;

(iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a spent fuel management facility;

(v) incidents significant to safety are reported in a timely manner by the holder of the license to the regulatory body;

(vi) programs to collect and analyze relevant operating experience are established and that the results are acted upon, where appropriate;
(vii) decommissioning plans for a spent fuel management facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body.

7.6.1 Nuclear Power Plant Dukovany

7.6.1.1 SF pools

The SF pools are partial process facilities of the EDU reactor units and as such they do not require separate licenses for operation, no safety reports have been elaborated for them or limits and conditions for safe operation; all these issues have been addressed within the operation of reactor units. Safety evaluation for EDU reactor units has been in detail described in the National Report by the Czech Republic under the Convention on Nuclear Safety, elaborated in September 2004.

To complete the information, it should be mentioned that the operation of the pools is governed by a number of operating procedures, e.g.:

- P026 Cooling system for storage pool water,
- P186j Fuel handling in the core, storage pool and cavity No. 1

Also the limits and conditions for safe operation of reactor units shall apply for the operation of SF pool and establish in respect to SF pool requirements for:

- level , temperature and concentration of H_3BO_3 in the storage pool,
- the cooling system of the storage pools.

7.6.1.2 ISFSF Dukovany

Construction of the ISFSF Dukovany building started after a demanding approval procedure in summer 1994. In less than a year the project was completed in summer 1995 and the first CASTOR-440/84 cask was delivered. From September 1995 all tests were performed and final adjustments of the facility, and the first filled cask was introduced into ISFSF Dukovany on December 5, 1995. At that moment also started the trial operation of the facility, which was scheduled to last 12 months. All design assumptions were verified during the trial operation and no serious non-nominal situations occurred. Therefore the trial operation was completed in January 1997 and ISFSF Dukovany moved into a permanent operation. The mentioned stages were supported with respective documents and the transition from one stage into another was conditional upon SÚJB approval.

As on 31 December 2004 ISFSF Dukovany contained 4536 SF assemblies in 54 CASTOR-440/84 casks. The numbers of stored casks with FAs since 1995 are shown in Fig. 7.1.

The increased number of stored casks in Dukovany in 1996 – 1997 is due to the reimportation of 1176 SF assemblies produced in NPP Dukovany and temporarily stored in ISFSF Jaslovské Bohunice in the Slovak Republic. For the last cask with SF imported from ISFSF Jaslovské

Bohunice and filled with SF only partly, a test for re-flooding of the cask was tested. After the controlled flooding of the cask the fuel was added from SF pool and the cask was placed in ISFSF Dukovany in a standard manner. The equipment for re-flooding is a standard accessory for CASTOR-440/84 cask at NPP Dukovany and its use was at the time worldwide unique.

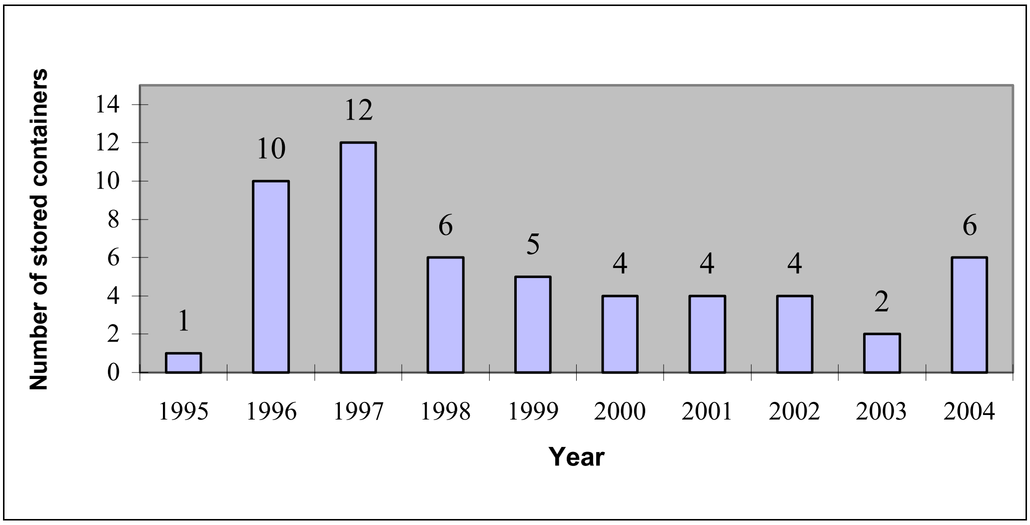

Diagram 7.1 Numbers of stored packagings kept in ISFSF Dukovany

The operation of ISFSF Dukovany is performed in agreement with the operating procedure P181j, while all conditions shall be observed as specified in the resolutions issued by SÚJB and in limits and conditions for operation of ISFSF Dukovany, also approved by SÚJB.

The limits and conditions for operation of ISFSF Dukovany deal with the following:

- maximum number of casks in the storage hall of ISFSF Dukovany,
- geometric arrangement of casks in the storage hall of ISFSF Dukovany,
- maximum temperature on the cask surface,
- tightness of casks,
- radiation monitoring of casks,
- moving of casks for fuel assemblies into the main production building,
- anti-fire system devices,
- provision of supply and outlet of the ventilation air in the hall of ISFSF Dukovany,
- organizational measures (responsibilities of managers, inspections and supervision and reporting duty).

7.6.1.2.1 Monitoring, Inspections, Tests and Maintenance at ISFSF Dukovany

Radiation Monitoring

The radiation monitoring system is designed to monitor the radiation situation in the interior of ISFSF Dukovany and its surroundings, in order to regulate presence of persons in the environment with ionizing radiation and to document the minimum impact of the selected storage technology on the personnel, population and the environment.

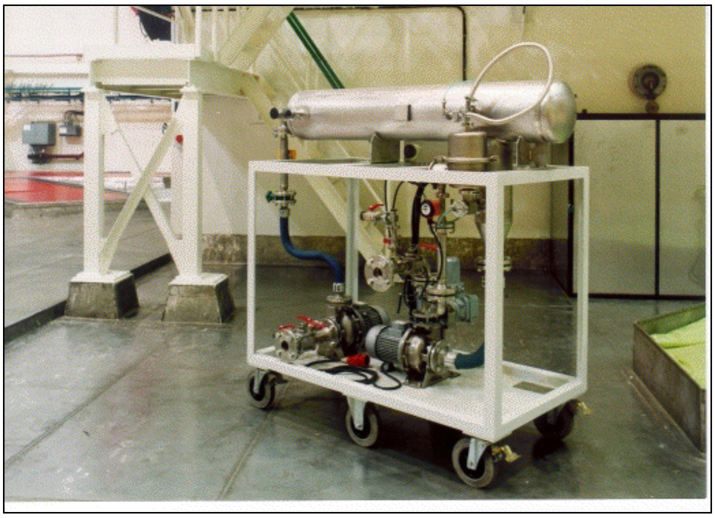

Fig. 7.4 Equipment for re-flooding of CASTOR-440/84 casks

The radiation monitoring system in the ISFSF Dukovany building includes:

- monitoring of gamma radiation dose rate,
- monitoring of neutron equivalent dose rate,
- monitoring of volume activity of gases and aerosols,
- monitoring of contamination of the working environment and items,
- monitoring of contamination of persons.

The radiation monitoring system in the surroundings of ISFSF Dukovany includes:

- monitoring of gamma radiation dose rate,
- monitoring of underground water activity.

The system is classified as a subsystem of the radiation monitoring system of NPP Dukovany. The monitoring data about dose rate and volume activity of gases in ISFSF Dukovany, as well as the monitoring data about pressure between the primary and secondary lids of the packagings, are displayed in the radiation monitoring central control room, where the parameters are continually checked.

<u>System measuring pressure between the packaging lids</u>

The purpose of the system is to provide local and remote, i.e. in the central radiation monitoring control room, information about the helium pressure in the space between two lids of each packaging. The data are used to determine tightness of the packagings and to adopt necessary measures.

The following signaling levels are set up in the pressure-measuring system:

- warning level 0,45 MPa,
- action level 0,35 MPa.

System measuring temperature on the packaging surface

Each packaging stored in the storage hall is provided with a temperature sensor and the cask is connected to a monitoring system.

The following signaling levels are set up in the temperature-measuring system:

- warning level 85°C,
- action level 100°C.

Periodic inspections of pressure sensors in the packagings

According to the Metrology Act and related regulations the helium pressure sensor between two lids of the cask is considered a working measuring device. Such a working device, in agreement with the metrology rules of NPP Dukovany, shall be subject to periodic inspections. The inspection period for pressure sensors on casks has been established at 6 years.

Fig. 7.5 A periodic inspection of a pressure sensor

Periodic inspections of trunnions on the cask

Periodic inspections of trunnions on the cask are performed every 3 years.

Periodic inspections of trunnions' bolts on the cask

Periodic inspections of pressure sensors on the packagings include inspections of trunnions' bolts every 6 years to check their potential corrosion. In agreement with a standard technological procedure TTČ-2003/01 the bolts are dismounted, inspected, cleaned and, if applicable, replaced and the trunnions are load tested.

Other inspections and maintenance at ISFSF Dukovany

Other inspection and maintenance at ISFSF Dukovany are performed in agreement with the operating procedure P181j.

7.6.1.2.2 Waste Management at ISFSF Dukovany

Neither normal operation nor conditions of design accidents will result in generation of RAW at ISFSF Dukovany. This is due to the selected technology for SF storage.

The overall annual production of waste is around 150 kg. The waste may be removed from ISFSF Dukovany only after an inspection measurement of contamination and approval of the radiation monitoring personnel. The waste is disposed in agreement with Act No. 185/2001 Coll., on wastes, as amended.

About 5 m^3 of liquid waste is generated every year from washing the floors and packagings in ISFSF Dukovany; the waste is stored in wastewater tanks with the volume 1.9 m^3. A sample is collected from each filled tank, measured by gamma spectrometry and the tank is either discharged into the sewerage system or moved into the reactor building to be discharged into a special drainage system, i.e. to be treated and discharged under control to dispose active residues in RAW Repository Dukovany.

7.6.1.2.3 Engineering and Technical Support of ISFSF Dukovany Operation

Technical and personnel sources of NPP Dukovany have been used to support operation of ISFSF Dukovany. This is one of the major advantages of the selected location of ISFSF Dukovany. As part of contracted technical support for NPP provided by research organizations, also some other tasks are addressed, associated with the operation of ISFSF Dukovany. A substantial part of the research efforts focuses on behavior of SF in the course of long-term storage and other works are planned investigating e.g. behavior of components of the stored casks.

7.6.1.2.4 Monitoring and Evaluation of Events during ISFSF Dukovany Operation

In agreement with legislative requirements NPP Dukovany has a developed system for investigation of operational events and also a system for sharing external operational experience. The systems apply both to the operation of reactors units and ISFSF Dukovany.

The system for investigation of operational events is specified in the EDU internal procedures.

Three types of operational events have been monitored in NPP Dukovany:

- safety relevant (important) events classified under the international INES scale ≥ 0,
- minor events classified outside the INES scale,
- events without consequences – identified before a potential failure, events in this category may be evaluated under INES either beyond the scale or by INES ≥ 0.

The procedure to analyze causes (direct and root causes) of the events is selected from a set of techniques used for analyses, e.g. methodology ASSET, HPES, barrier analysis, change analysis, flow chart of the course and causes of the event, etc.

In agreement with SÚJB requirements, EDU provides information by the agreed date to a SÚJB representative on all events rated under INES ≥ 0 and also on the adopted corrective measures. By discussing the events with SÚJB EDU meets the requirements specified in the Atomic Act. The SÚJB representative on the site also receives a list of all operational events every month.

The reliability and safety of ISFSF Dukovany is documented by the fact that throughout its entire operation since 1995 no event has occurred classified under the international INES scale.

To improve safety and reliability of NPP Dukovany, including ISFSF Dukovany, operational experience from other nuclear installations worldwide has been analyzed and used. The power plant in Dukovany has been an active member of international organizations, which associate operators of nuclear power plants from all over the world, and directly cooperates with several nuclear power plants in Europe. The sharing of experience takes place through this membership in organizations and contacts with other power plants. The process is described in the EDU internal procedure No. 09/107.

7.6.1.2.5 Regular Evaluations of ISFSF Dukovany Operation

Supervision activities by SÚJB in 2004 included two planned inspections of ISFSF Dukovany. In agreement with the limits and conditions for safe operation of ISFSF Dukovany the operator continually monitors basic physical parameters, such as pressure between the primary and secondary lid of each CASTOR 440/84 cask, dose equivalent rate in connection with the mapping of the radiation situation in ISFSF and its surroundings and, in excess to the standard approved limits and conditions, also the surface temperature of all stored casks. The measured values were in compliance with the limits and conditions approved by SÚJB for permanent operation of ISFSF Dukovany. In addition to the monitored physical parameters, also the condition of supporting pin clamping screws has been monitored since 2004 in order to ensure long-term safe manipulation with cask throughout the entire planned storage time.

In connection with a SÚJB requirement NPP Dukovany once a year on a regular basis elaborates a report on operation of ISFSF Dukovany, which is submitted to SÚJB. The report is a summary evaluation of the operation of ISFSF Dukovany in the past calendar year, including an overview of SÚJB supervision activities and their results.

The structure of the evaluation report about the operation of ISFSF Dukovany is provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1, of February 2003.

7.6.1.2.6 Concept for Decommissioning of ISFSF Dukovany

The concept for decommissioning of ISFSF Dukovany is the same as for the SFSF Dukovany (see chapter 7.4.5).

7.6.2 Nuclear Power Plant Temelín

Identically as in NPP Dukovany the SF pools in NPP Temelín are partial process facilities of the reactor units and as such they do not require separate licenses for operation, no safety reports have been elaborated for them or limits and conditions for safe operation; all these issues have been addressed within the operation of reactor units.

The operation of SF pools is subject to the operating procedure 1(2)T045 „Cooling system for SF pool“. The operation of SF pools is also subject to limits and conditions for safe operation as provided in TL001 (chapter A.3.9), which in respect to SF pool establish requirements for:

- level, temperature and concentration of H_3BO_3 in the storage pools,
- operability of cooling circuits in the storage pools cooling system,
- measures to prevent formation of pure condensate.

7.6.3 ÚJV Řež a. s.

7.6.3.1 Building 211/7 – SF Storage Facility

The storage facility is a part of the LVR-15 reactor and therefore it does not have a separate license for the operation.

For activities with a significant impact on nuclear safety and for activities important from the viewpoint of radiation protection written programs and working procedures have been developed. The documents have been elaborated in form of organizational procedures of ÚJV Řež a. s., as working procedures for the LVR-15 reactor workplace. Their list is provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1, of February 2003.

7.6.3.2 Building 211/8 – HLW Storage Facility

A detailed overview of working and technological procedures associated with the operation of the high-level waste storage facility is provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1, of February 2003. Additionally, as a part of the licensing process for reconstructions or other changes affecting nuclear safety, radiation protection, physical protection and emergency preparedness of nuclear installations and workplaces in category III or IV, in respect to the high-level waste storage facility building 211/8, in ÚJV Řež a. s., documents were submitted to SÚJB including the following:

- Limits and conditions for operation of the HLW storage facility in the course of hot cell construction, Edition No. 4, Revision No. 0, Cat. No.: 3.9.7-3.1/HLW, 29 September 2003
- Limits and conditions for operation of the HLW storage facility with the hot cell in operation, Edition No. 5, Revision No. 0, Cat. No.: 3.9.7.-3.2/HLW, 29 September 2003
- Monitoring program for operation of the HLW storage facility, Edition No. 4, Revision No. 0, Cat. No.: 2.3.2.1-3/300, 1 October 2003
- Definition of the controlled area for operation of the HLW storage facility, Edition No. 4, Revision No. 0, Cat. No.: 2.3.4 -3/300, 1 October 2003
- Proposed method of decommissioning of the refurbished HLW storage facility (Building 211/8), Edition No. 1, Revision No. 0, Cat. No. 3.9.8-3/HLW, 29 August 2003
- Quality assurance program, Implementation of refurbishment of the high-level waste storage facility – building 211/8, Edition No. 1, Revision No. 0, Cat. No.: 4.2.43/315, 24 July 2003
- List of selected equipment, Implementation of refurbishment of the high-level waste storage facility – building 211/8, Edition No. 1, Revision No. 1, Cat. No.: 4.4.2/315, 1 September 2003
- On-site emergency plan for operation of the HLW storage facility, Edition No. 2, Revision No. 0, Cat. No.: 3.9.1-3/300, 1 July 2003

- Plan of inspections and tests, Implementation of refurbishment of the HLW storage facility – building 211/8, Edition No. 1, Revision No. 0, Cat. No. 4.10.88/306, 1 September 2003
- Execution of non-standard activities in the building 211/8 (HLW storage facility), Construction HK-EK-10, Edition No. 1, Cat. No. 2.3.2.1/HLW/1, 18 September 2003
- Estimate of costs for decommissioning of the refurbished HLW storage facility (building 211/8), Edition No. 1, Revision No. 0, Cat. No.: 3.9.8-3/HLW, 29 August 2003, audited by the Administration of Radioactive Wastes Repositories
- Quality assurance program, Manufacture and installation of storage safe for chamber EK-10, Edition No. 1, Revision No. 0, Reg. No. DRS 1165/2003, Cat. No.: 4.2-1/805, 1 October 2003

7.6.3.2.1 Monitoring, Inspections, Tests and Maintenance in the HLW Storage Facility

Radiation Monitoring

The radiation monitoring system of the HLW storage facility, as described in the monitoring program for the facility operation, includes

- monitoring of workplaces with ionizing radiation sources,
- personnel monitoring,
- monitoring of discharges,
- monitoring of the storage facility surroundings

Monitoring in the pool B

In order to ensure shielding of fuel assemblies stored in the pool B in the HLW storage facility and in order to ensure radiation protection of the personnel, the shielding water level and its volume activity are continually monitored in agreement with the limits and conditions for operation of the facility and with the program of operating inspections. Moreover, in order to minimize corrosion of the fuel assemblies, pool, circulation system and water purification system, additional parameters are monitored, such as specific conductivity of water, water pH and temperature and concentration of Cl, Al, Fe and Cu ions.

Monitoring of the MIX 1000 demineralization station

In order to ensure the required quality of the shielding water some parameters of the MIX 1000 demineralization station are monitored, particularly the maximum conductivity at the station outlet, and the ion exchangers are regenerated at the same time.

7.6.3.2.2 Waste Management in the HLW Storage Facility

Under normal operating conditions no significant quantity of RAW is generated in the storage facility. The MIX 1000 demineralization station includes a sump for liquid RAW comprising particularly wastes from ion exchanger regeneration and rinsing water. The liquid RAW is pumped from the sump into a transport tank to be moved to the facility Velké zbytky, where it is treated with other liquid RAW.

7.6.3.2.3 Regular Evaluations of Operation of the HLW Storage Facility

As a part of its supervisory activities SÚJB completed one inspection of the facility in 2004, focused on observation of the limits and conditions for safe operation during construction of the hot cell and documents recording the course of the reconstruction.

Once a year the operator of the HLW storage facility submits to SÚJB an evaluation of observation of applicable limits and conditions. The documents deal with the compliance with:

- selected limits and conditions for operation of the high-level waste storage facility – parameters of the shielding water in the pool B and output from the demineralization station,
- quality limits for the shielding water in the pool B,
- temperature limits in the facility,
- limits for air volume activity, and
- limit conditions for dose rates on the surface of columns in the demineralization station.

The document also includes an overview of the demineralization station operation during the whole calendar year and a summary of shielding water quality in the pool B.

7.6.3.2.4 Concept for Decommissioning of HLW Storage Facility

The proposed method of decommissioning of the HLW storage facility is a part of documents to obtain a license for operation of a nuclear installation, pursuant to the Appendix to Act No. 18/1997 Coll., item D, letter b), paragraph 9. Methods and procedures of decommissioning are specified in Decree No. 185/2003 Coll. (its draft was developed in 2001 using the preceding Decree No. 196/1999 Coll.).

The storage facility has been in operation since 1995 and its service life has been planned for 50 years. The decommissioning should therefore occur approximately in 2045. It is anticipated that the decommissioning will be a one-off dismounting and that it will be possible to use the storage building for other purposes.

Decommissioning of the HLW storage facility will be preceded by removal of all radioactive waste, SF and surveillance program samples. Subsequently, the cooling water and ion exchangers will be removed and treated, radiation situation in the storage will be monitored, surfaces decontaminated, piping, valves and technological equipment dismounted, RAW will be fragmented and decontaminated, treated and disposed. The last step will be removal of non-contaminated water and contaminated waste below the limits for discharge into the environment. It is expected that the decommissioning of the facility will produce ca. 15 drums for disposal, 200 l each.

7.7 Disposal of SF

If, pursuant to its own legislative an regulatory framework, a Contracting Party has designated spent fuel for disposal, the disposal of such spent fuel shall be in accordance with the obligations of Chapter 3 relating to the disposal of radioactive waste.

The Czech Republic anticipates development of a deep repository in granitic rock formations after 2065. Based on earlier geologic data ca. 30 potential locations have been identified in the

Czech Republic. The repository is expected to accommodate all RAW that cannot be disposed in near-surface repositories, SF classified as RAW and alternatively also HLW from potential reprocessing of SF from EDU and ETE, or SF and HLW from other potential nuclear sources. The overall amount of SF from four units of NPP Dukovany will be 1940 t HM and from two units of NPP Temelín 1370 t HM as a result of the planned period of operation of all the units.

In 1998 – 1999 another alternative for SF disposal was considered in non-dismounted condition and non-shielded casks within the program „Reference project of surface and underground systems in deep repositories in the host environment of granitic rock formations in the agreed structure of the initial design and to the depth of design study“. According to the project, the disposal casks should be surrounded by a bentonite layer and vertically placed in tunnels on a granite massif, about 500 m under the surface part of the DGR.

On 17 – 21 May 2004 SÚRAO hosted in his headquarters in Prague a WATRP mission (Waste Management Assessment and Technical Review Program) which sought to assist the Czech Republic and to provide engineering opinions and comprehensive assessment of deep repository development. At present the main efforts in respect to deep repository development focus on selection of a suitable location, i.e. reduction of the number of six locations selected for future investigation in the Czech Republic. More studies of the project and engineering barriers have been under way, based on generic designs of deep repositories (i.e. designs not specific for a particular location), some optimization studies have been completed and research of materials to be used as engineering barriers has started. Safety studies focus on development of model tools/processes and demonstration of general safety of deep repositories (i.e. completion of a safety analysis and studying of natural analogs). Additional activities include project management, i.e. planning, budgeting, quality management, involvement of the general public, gathering of information and international cooperation. Recommendations provided by the mission will be taken into account by SÚRAO when planning and performing further activities in DGR development. A detailed report on conclusions made by the WATRP mission has been published on the SÚRAO website.

When performing ground investigations in connection with potential DGR development mayors and population of the concerned municipalities showed strong opposition against potential development of DGR. For this reason MPO and SÚRAO reached an agreement approved by the government and the ground investigations in the locations will not continue until 2009.

8. Safe RAW Management – Articles 11 - 17 of the Joint Convention

8.1 General Safety Requirements

Each Contracting Party shall take the appropriate steps to ensure that at all stages of radioactive waste management individuals, society and the environment are adequately protected against radiological and other hazards.
In so doing, each Contracting Party shall take the appropriate steps to:

(i) ensure that criticality and removal of residual heat generated during radioactive waste management are adequately addressed;
(ii) ensure that the generation of radioactive waste is kept to the minimum practicable;
(iii) take into account interdependencies among the different steps in radioactive waste management;
(iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;
(v) take into account the biological, chemical and other hazards that may be associated with radioactive waste management;
(vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;
(vii) aim to avoid imposing undue burdens on future generations.

The Atomic Act in Section 24 paragraph 1 requires any person managing RAW to take into account all their physical, chemical and biological properties that might affect safety of the waste management. The requirement is worded in a more detailed manner in Section 46 paragraph 3 of Decree No. 307/2002 Coll. as follows: *„in radioactive waste management in addition to radioactivity, all the other hazardous properties shall be taken into account which might influence the safe waste management, particularly toxicity, flammability, explosiveness, spontaneous fissionability, formation of critical mass or residual heat.“* These hazardous properties are in RAW management addressed in agreement with general legal regulations on waste management.

Also Decree No. 195/1999 Coll. in Section 47 defines requirements to assure undercriticality and heat removal. *„The installation for the handling with the irradiated and spent nuclear fuel and its storage, and for the handling and storing the other substances containing the fissile products and radioactive substances shall be designed in a such way, in order that it may be possible to prevent with margin the achievement of criticality even under conditions of the most effective deceleration of neutrons (optimum moderation) by area arrangement or by other physical means* *and procedures, and by this to prevent the exceeding the 0.95 value of effective neutron multiplication coefficient under the assumed accident situations (including the flooding by water), the exceeding the 0.98 value of effective neutron multiplication coefficient under the conditions of optimum moderation and to assure the adequate residual heat removal under normal and abnormal operations and under accident conditions."*

In connection with the effort to minimize generation of RAW the Atomic Act in Section 18 paragraph 1 letter d) positively requires to keep generation of RAW and SF to the minimum necessary level.

A holder of a license to manage RAW submits once a year to SÚJB a document containing evaluation of RAW management, which includes proposed improvements (to minimize generation of RAW) and their implementation. The key method for minimization of RAW products consists in their collection, segregation and use of effective separation methods.

Mutual links between the individual steps of waste management are described in Sections 46 – 55 Decree No. 307/2002 Coll. The document defines the basic principle saying that no activity in any individual step of RAW management shall adversely influence activities that follow thereafter.

The Czech legislation in radiation protection has been developed based on internationally recognized standards and criteria. The legislation is based on safety standards IAEA Safety Series 115 and EU legislation- Directive No. 96/29/Euratom. Three fundamental pillars of radiation protection have been employed – optimization, justification and limitation and these have been integrated into the Atomic Act and Decree No. 307/2002 Coll., on radiation protection. This is documented by the requirements in Section 46 paragraph 2 of Decree No. 307/2002 Coll., saying that: *" For radioactive waste management, radiation protection shall be ensured in the same way and scope as for other radionuclide sources unless expressly specified otherwise in a license."* In the Czech Republic no RAW management shall be permitted without a license (Section 9 of the Atomic Act) issued by SÚJB.

Concerning the requirement to avoid actions that impose *practical* impacts on future generations or impose undue burdens on future generations, provision of Section 4 paragraph 2 of the Atomic Act says that: „*Whoever utilizes nuclear energy or performs radiation practices or interventions to reduce natural exposure or exposure due to radiation incidents must ensure that his or her action is justified by the benefits outweighing the risks arising or liable to arise from these activities."*

One example of application of this provision is the provision of Section 52 paragraph 6 of Decree No. 307/2002 Coll., saying that *"The dose constraint for safe disposal of radioactive waste shall be an effective dose of 0.25 mSv per calendar year and individual from the critical group of the population."* Also all requirements for safe management of ionizing radiation sources shall apply to RAW management.

8.2 Existing Facilities and Past Practices

Each Contracting Party shall in due course take the appropriate steps to review:

(i) the safety of any radioactive waste management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility;

(ii) the results of past practices in order to determine whether any intervention is needed for reasons of radiation protection bearing in mind that the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including the social costs, of the intervention.

8.2.1 Nuclear Power Plant Dukovany

Assessment of safety of all facilities for RAW management was initially performed in agreement with safety requirements specified in Act No. 28/1984 Coll., on state nuclear safety supervision of nuclear installations, and its implementing regulations. Based on a favorable assessment of the submitted documents (see 8.4) and results of the inspections a license was issued for their permanent operation. Requirements for safe RAW management corresponded to the then recognized international standards.

Subsequently, the safety of all facilities for RAW management was re-assessed in agreement with the safety requirements for these facilities specified in the Atomic Act and its implementing regulations. Based on this assessment SÚJB issued for EDU a license for RAW management under Section 9 paragraph 1 letter j) of the Atomic Act. The license was issued for a limited period of time and before its expiry the facility's safety shall be re-assessed again. The safety of these facilities, i.e. RAW management facilities, is on regular basis evaluated by the operator in agreement with its internal quality assurance documents.

EDU now includes the following technology systems for RAW management:

- systems for treatment of liquid radioactive media,
  - treatment plant for SF pool water SVO 4,
  - treatment plant for boric acid SVO 6,
  - treatment plant for wastewater SVO 3.
  - a subsystem of sedimentation, emergency and overflow tanks designed for accumulation and storage of waste water in order to separate mechanical impurities (by sedimentation) before treating them on an evaporator,

The systems are common for reactor units 1 and 2 (HVB I), and for units 3 and 4 (HVB II).

The aim of liquid RAW treatment is to concentrate radioactive substances contained therein to the minimum volume possible. A fraction of the original content of radioactive substances passes to the treated media that are recycled in the controlled area of NPP Dukovany.

HVB I and II each have a treatment plant for SF pool water SVO 4, which provides for discharge, making up and treatment of water from the reactor well and SF pool water and for treatment of water from emergency supply tank of boric acid in HVB. Water from boric acid sewers in HVB and BAPP is treated separately in the boric acid treatment station SVO 6 (evaporation technology and final treatment of boric condensate and filter condensate on ion exchangers) and after treatment it is recycled at NPP – regeneration of the boric acid reduces the quantity of produced liquid RAW and thus also demand for disposal. Separation of under-limit water containing chemicals reduces the quantity of produced RAW and also the quantity of waste to be disposed. Low-activity water from a special laundry and hygienic closures is after radiochemical inspection discharged into NPP wastewater sewerage. If the water fails to meet the conditions for discharge it is treated jointly with wastewater from HVB at SVO 3. Steam generator blowdown is treated on the ion exchanger filtration station SVO 5 which provides for qualitative parameters of water in the secondary circuit.

The wastewater treatment plant SVO 3 is used to treat water from special sewerage and water from washing and regeneration of filtration lines of the individual treatment plants in HVB and BAPP. The water is accumulated in wastewater tanks and further run to evaporators in SVO 3, where the water is concentrated to ca. 200 g/l of salts and the concentrate is kept in tanks with liquid RAW. A part of the condensate is further treated on a mechanical filter and on ion exchangers at SVO 3 and recycled at EDU. Tanks with the concentrate are used to store concentrated RAW before further processing (bituminization).

- Systems for RAW management:
  - Systems for storage of liquid RAW,
    - ⇒ a subsystem of tanks with active RAW concentrate, designed to store concentrated liquid waste resulting from wastewater treatment on the evaporator,
    - ⇒ a subsystem of storage tanks for radioactive sorbents to store spent ion exchangers.

    The subsystems may operate independently or in mutual cooperation. Each subsystem is common for the reactor units 1 and 2 and for units 3 and 4.
  - Systems for conditioning of liquid RAW:

    Systems for conditioning of liquid RAW consist of the process equipment of the operating unit "Bituminization". The system is common for all four reactor units.

    In the "Bituminization" operating unit liquid RAW (radioactive concentrate) is immobilized in bitumen, i.e. into a form suitable for disposal. The main process equipment is a film rotor evaporator where the concentrate is mixed with bitumen and water is evaporated. The resulting product is filled into 200-liter drums. The drums are transported on a conveyor. Once a drum is filled and cooled, it is covered with a lid by a manipulator, removed from the conveyor and placed into the handling area.
  - Systems for collection, storage and conditioning of solid RAW.

    Collection, storage and treatment of solid RAW are situated in the BAPP building and consists of a segregation workplace and storage of solid RAW. Each subsystem is common for the reactor units 1 and 2 and for units 3 and 4. Solid RAW are stored in box pallets, i.e. low-pressure compacted in 200 l casks.

    A part of solid RAW suitable to be cleared into the environment is after previous segregation and measurements officially measured to check the content of radionuclides.

This is performed in the newly refurbished building “Auxiliary Boiler House“ subject to the monitored zone regime.

The wastes which meet criteria specified in Decree No. 307/2002 Coll. are cleared into the environment without any SÚJB permit, to the dump for solid municipal waste Petrůvky.

8.2.2 Nuclear Power Plant Temelín

Safety assessment of all facilities for RAW management was performed at ETE in agreement with the safety requirements specified for these facilities in the Atomic Act and its implementing regulations. Based on a favorable assessment of the submitted documents (see 8.6) and results of the inspections a license was issued for their trial operation. At the same time a license was issued for RAW management under Section 9 paragraph 1 letter j) of the Atomic Act. Operability and safety of the facilities for RAW management is regularly monitored and evaluated by the operator.

The following technology systems for RAW management are now situated at ETE in BPP:

- systems for treatment of liquid radioactive media,
- systems for storage and processing of liquid RAW,
- systems for gathering, storage and processing of solid RAW.

The system for treatment of liquid radioactive media includes:

- treatment plant for SF pool water SVO 4,
- treatment plant for impure condensate SVO 6,
- treatment plant for wastewater SVO 3.

The aim of liquid radioactive media treatment is to concentrate radioactive substances contained therein to the minimum volume possible. A fraction of the original content of radioactive substances passes to the treated media that are recycled in the controlled area of NPP Temelín.

A treatment plant for SF pool water SVO 4 is situated in BPP, which provides for discharge, making up and treatment of water from the reactor well and SF pool water and for treatment of water from emergency supply tank of boric acid in HVB. Water from boric acid sewers in HVB and BAPP is treated separately in the boric acid treatment station SVO 6 (evaporation technology and final treatment of boric condensate and filter condensate on ion exchangers) and after treatment it is recycled at NPP. Regeneration of the boric acid reduces the quantity of produced liquid RAW and thus also demands for disposal.

Separation of under-limit water containing chemicals reduces the quantity of produced RAW and also the quantity of waste to be disposed. Low-activity water from a special laundry and hygienic closures is processed in a centrifuge in a regime separate from radioactive water – dry matter is filled into plastic bags and put into casks; separated water is after radiochemical inspection discharged into NPP wastewater sewerage. Steam generator blowdown is treated on the ion exchanger filtration station SVO 5 which provides for qualitative parameters of water in the secondary circuit.

The wastewater treatment plant SVO 3 is used to treat water from special sewerage and water from washing and regeneration of filtration lines of the individual treatment plants in HVB and BPP. The waters are from an accumulation point run into a centrifuge. Wastewater from the centrifuge is run to a wastewater tank and further to evaporators for wastewater treatment at SVO 3, concentrated to ca. 200 g/l of salts and the concentrate is moved to a tank with concentrate in the interim storage of liquid RAW. The tank also contains radioactive sludge from centrifugation or sedimentation of radioactive wastewater. Condensate after final treatment on SVO 3 filters is recycled at ETE for home consumption.

The system for storage and conditioning of liquid RAW includes an interim storage for liquid RAW consisting of:

- technological node of tanks with sorbents,
- technological node of tanks with concentrate,
- technological node of concentrate solidification.

The system for collection, storage and conditioning of solid RAW includes

- segregation and fragmentation workplace,
- storage of solid RAW.

The interim storage of liquid RAW serves to accumulate and store concentrated RAW before further conditioning (bituminization). One technological node includes tanks with sorbents to store sorbents from all filtration stations in HVB and BPP, another technological node includes tanks with concentrate containing radioactive concentrate from SVO 3 evaporators, as well as radioactive sludge from SVO 3 centrifuge. The technological node for solidification of liquid RAW carries out immobilization of concentrated forms of liquid RAW in bitumen into a form suitable for disposal. The main process equipment is a filter rotor evaporator where the two components (concentrated liquid RAW and bitumen) are spread on an internal jacket surface and excess water is evaporated. The resulting product flows down into the evaporator bottom part and is filled via a stop valve into 200-liter drums. The drums are moved under the evaporator on a round 16-positions carousel. Once a drum is filled it remains on the carousel on several more positions and the product cools down. Then it is covered with a lid, taken down from the carousel by a swiveling manipulator and on a track platform moved into the handling space.

A part of the solid RAW from ETE, which meets requirements under Decree No. 307/2002 Coll., is cleared into the environment based on a SÚJB permit and the remaining solid RAW from the main production unit is processed, treated and stored in BPP.

8.2.3 SÚRAO

Safety of repositories is demonstrated by compliance with the basic limits for radiation protection. The limits to be observed are the annual effective dose equivalent for the workers at 20 mSv and annual effective dose equivalent for individuals from a critical group of population at 250 μSv/r. All this is demonstrated in documents supporting the application for a license to operate a repository (particularly in safety analyses from which limits and conditions for the repository operation are derived) under Section 9 paragraph 1 letter d) of the Atomic Act and in documents supporting the application for a license to manage RAW under Section 9 paragraph 1, letter j) of the same Act. Before issuing the licenses SÚJB verifies compliance of the actual status with the documents by inspections.

8.2.3.1 RAW Repository Richard

RAW Repository Richard has been developed in a complex of former limestone mine Richard II (inside Bídnice hill - 70 m under the ground level). Its communication passageway is 6 - 8 m wide and 4 - 5 m tall. Individual disposal chambers are accessible from the passageway.

Since 1964 the repository has been used to dispose institutional waste (RAW from utilization of radioisotopes in medical care, industry and research). The total volume of adapted underground premises exceeds 17 000 m^3, while the capacity for waste disposal is about a half of the volume and the rest are service galleries. Safety of the operating repository is checked by a monitoring system in agreement with a monitoring program approved by SÚJB. The method of the repository closing has been assessed by safety analyses.

Based on the findings from hydrogeology, geology engineering, geotechnical and seismic surveys, construction expert reports and the condition of disposed containers it is possible to conclude that throughout the location all requirements for radiation protection and nuclear safety have been met on a long-term basis in compliance with the Atomic Act and its implementing regulations. The repository has been operated based on a license issued by SÚJB.

Fig. 8.1 A view into a storage chamber in RAW Repository Richard

8.2.3.2 RAW Repository Bratrství

The repository is designed exclusively for waste containing natural radionuclides.

The repository was developed by adaptation of a gallery in a former uranium mine, while five chambers were adapted for waste disposal with the total volume of nearly 1200 m^3. The repository started operating in 1974. The mine is situated in a water-bearing crystalline complex and therefore a drainage system has been built in the surroundings of the repository area with a central retaining tank and flow-through retaining tanks. The removed water is monitored. It has been concluded that the site on a long-term basis meets all requirements for radiation protection and nuclear safety. The repository has been operated based on a license issued by SÚJB.

Fig. 8.2 A view into a storage chamber in the Bratrství repository

8.2.3.3 RAW Repository Dukovany

Fig. 8.3 Closing a full vault with concrete

RAW Repository Dukovany has been developed in the site of NPP Dukovany to dispose of conditioned RAW from the nuclear energy industry. A potential release of radionuclides into the biosphere is prevented by a system of barriers with a long service lifetime. The repository has been in operation since 1995. The total volume for waste disposal is 55 000 m^3 (ca. 180 000 200-liter drums) is sufficient to accommodate all RAW from NPP Dukovany and NPP Temelín, provided the waste meets acceptance conditions for disposal, even in case the operation time of the plants is extended to 40 years. Safety of the operating repository is checked by a monitoring system in agreement with a monitoring program approved by SÚJB. The method of the repository closing has been assessed by safety analyses. The repository is operated based on a license for operation issued SÚJB.

Fig. 8.4 A view into a partly filled vault in RAW repository Dukovany

8.2.3.4 RAW Repository Hostím

RAW Repository Hostím was in operation in 1959 – 1964. It was built in 1959 in limestone mine Alkazar nearby the village of Hostím by adaptation of two galleries driven in 1942 -1944. The total volume of the two galleries was about 1690 m^3. The repository contains low-and intermediate-level wastes from ÚJV Řež a. s. and ÚVVVR. The operation of the repository was terminated in 1965.

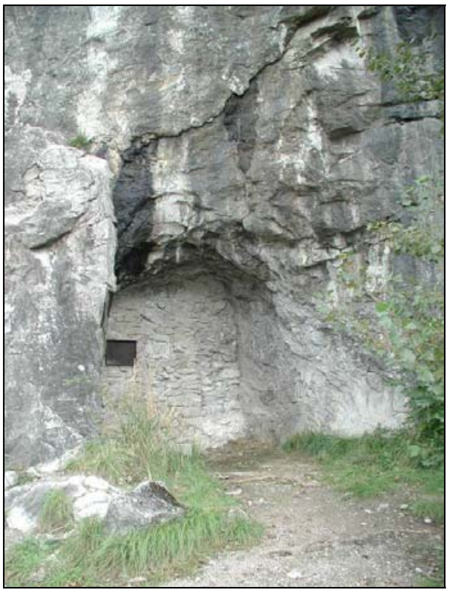

Fig. 8.5 Secured entrance into the Hostím repository

To assure safety of the disposed waste (sufficient barrier preventing unauthorized persons from entering) both the galleries were filled with a special concrete mixture. Before the filling, inventory taking was performed and all long-term radionuclide sources and chemical wastes were removed from the repository.

In 1990 – 1991 a hydrogeologic monitoring system of institutional inspection was developed and it has been operated by SÚRAO. Also a network was established of geodynamic points to measure movements of the rock massif. The monitoring results have proved tightness and safety of the closed repository. The repository has been closed since 1997.

8.2.4 ÚJV Řež a. s.

ÚJV Řež a. s. has two operating facilities for RAW management:

- building 241 – Velké zbytky (RAW management facility) with technology for RAW processing,
- building 211/8 – HLW storage facility.

Apart from the mentioned facilities, there are additional facilities that had been in the past used for RAW management purposes. The latter are no more in operation, they form a part of old environmental loads and have been gradually removed. They include:

- building 211/6 – Reloading site for RAW,
- storage area for RAW Červená skála,
- building 211/5 – Decay tanks for RAW.

8.2.4.1 Building 241 – RAW Management Facility Velké zbytky

Building 241 contains the following process equipment for RAW management:

- FDS – installation for fragmentation and decontamination of RAW. FDS also serves as a development base to improve the existing and develop new decontamination procedures and technologies,
- equipment for compacting of solid pressable RAW – low-pressure screw mechanical press for compressible RAW (paper, PE, rubber, cellulose wadding, etc.),
- evaporation system for concentration of liquid RAW – to process liquid RAW produced mostly by research facilities within ÚJV Řež a. s.,
- solidification of liquid and solid RAW by cementation – for both solid and liquid (concentrate) RAW.

The performed and planned measures to improve safety in Building 241 have been as follows:

- FDS – the facility was introduced recently and no steps are necessary to improve its safety. It has been gradually provided with new fragmentation and decontamination technologies,
- equipment for compacting of solid compressible RAW – a new hydraulic press will be introduced in 2005,
- evaporation system to concentrate liquid RAW – the system was introduced only recently and no steps are necessary to improve its safety,
- solidification of solid and liquid RAW by cementation – will be provided with new technology in the future,

- in 2004 a new stationary dosimetric system and system for monitoring of radioactive aerosols in the air were introduced, the systems have been test-operated by now.

In addition to the above-mentioned technologies, Building 241 also includes old process equipment, already decommissioned. There are e.g. old evaporation systems for concentration of liquid RAW, storage tanks etc. The technology forms a part of old environmental liabilities to be liquidated in the nearest future. Additional measures relating to radiation protection will be necessary during the process of liquidation.

8.2.4.2 Building 211/8 – HLW Storage Facility

The HLW storage facility has been designed to store SF from research nuclear reactors and solid RAW. The facility is a prefab hall with the ground plan 12 × 72 m, 15 meters high. Inside the space is divided into eight concrete square-shaped boxes to store solid RAW, SF EK–10, in dry concrete casks. Two cylindrical tanks are used for SF IRT–M. Each box contains an inner corrosion resistant tank placed in a tank made of carbon steel set in a concrete bed. The tank diameter is 4.6 m, water level 5 m. The storage area is divided horizontally into three levels with concrete panels. The upper covering layer consists of two shielding panels.

The following safety improvements have been made in the Building 211/8 – HLW storage facility:

- installation of an automatic monitoring system for conductivity of the shielding water in SF pool , with automatic start-up of the demineralization station,
- construction of new cable routes for the physical protection system in the HLW storage facility; unlike in the past, the cables are now under the ground,
- improvement of the physical protection system – replacement of the tanks covers – the original covers were made of steel profiles and Plexiglas and they have been replaced with all-metal covers with the minim weight of each part 150 kg. The covers cannot be taken off without a crane,
- in 2004 a new stationary dosimetric system and system for monitoring of radioactive aerosols in the air were introduced, the systems have been test-operated by now.

8.3 Siting of Proposed Facilities

1. *Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed radioactive waste management facility:*

(i) to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime as well as that of a disposal facility after closure;
(ii) to evaluate the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of the site conditions of disposal facilities after closure;
(iii) to make information on the safety of such a facility available to members of the public;
(iv) to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating

to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.

2. *In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 11.*

The legislative framework for siting of RAW repository and workplaces for RAW management in NIs from the viewpoint of nuclear safety and radiation protection consists of the Atomic Act and its implementing regulations:

- Decree No. 215/1997 Coll., on criteria for siting of nuclear installations and very significant sources of ionizing radiation,
- Decree No. 214/1997 Coll., on quality assurance in activities associated with nuclear energy use and radiation practices and on establishing criteria for classification and categorization of classified equipment into safety classes,
- Decree No. 307/2002 Coll., on radiation protection,
- Decree No. 144/1997 Coll., on physical protection of nuclear materials and nuclear installations and their classification.

As mentioned in 5.2.2, siting of a NI is one of the activities for which SÚJB shall issue a license in agreement with Section 9, paragraph 1, letter a) of the Atomic Act from the viewpoint of nuclear safety and radiation protection. The preconditions for the license issue under Section 13 of the Atomic Act are:

- *„evaluation of the environmental impact of the nuclear installation“* under Act No. 100/2001 Coll., on assessment of impacts on the environment,
- *„approval of a quality assurance program for the licensed activity.“*

An application for the license to site a nuclear installation shall be in agreement with Appendix A to the Atomic Act supported with:

- Initial Safety Report which shall include:
  - description and evidence of suitability of the selected site from the aspect of siting criteria for NIs or RAW repositories as established in a legal implementing regulation;
  - description and preliminary assessment of the design concept from the viewpoint of requirements laid down in implementing regulations for nuclear safety, radiation protection and emergency preparedness;
  - preliminary assessment of impact of operation of the proposed installation on personnel, the public and the environment;
  - proposal of a concept for safe decommissioning;
  - assessment of quality assurance in the process of selection of site, method of quality assurance for preparatory stage of construction and quality assurance principles for linking stages.
- Analysis of needs and possibilities of physical protection.

More detailed requirements for the content of the Initial Safety Report are provided in a SÚJB guideline.

Decree No. 215/1997 Coll. establishes criteria to assess suitability of the selected site from the viewpoint of nuclear safety and radiation protection. The protection of interests from other aspects, as required by the valid legislation, remains unchanged. The Decree defines following excluding and conditional criteria:

- the excluding criteria positively exclude the location to be used as a site for a NI or repository. The criteria include both radiological effects of the considered installation on its surroundings under planned operating conditions and in case of a radiation accident, and also effects of the location on the radiation and nuclear safety of the installation,
- the conditional criteria enable to use the territory or land as a NI site under condition that a technical solution is possible or available to address unfavorable local conditions, both natural or caused by human activities.

The implementing regulation to the Atomic Act, Decree No. 195/1999 Coll., on requirements for nuclear installations to assure nuclear safety, radiation protection and emergency preparedness and, particularly in Decree No. 215/1997 Coll., on criteria for siting of nuclear installations and very significant sources of ionizing radiation, take into account IAEA recommendations and methodical guidelines concerning siting of nuclear installations.

In agreement with the IAEA recommendations the above-mentioned implementing regulations of the Atomic Act require that the design shall take into account the historically most serious phenomena reported for the given location and its surroundings and effects of a combination of natural phenomena and phenomena initiated by human activity and emergency conditions caused by such phenomena. The regulations further require for siting and designing that NI is evaluated from the viewpoint of resistance against the following natural phenomena and phenomena initiated by human activity:

- earthquake,
- climatic effects (wind, snow, rain, outdoor temperatures etc.),
- floods and fires,
- fall of an aircraft and falling objects,
- explosion of industrial, military and transport facilities, including explosions of nuclear installation objects,
- leakage of hazardous explosive liquids and gases.

Based on a probabilistic evaluation some events may be excluded, provided their probability is very low. Specification of the limit level for the individual cases is within the SÚJB competence.

Act No. 18/1997 Coll. in Section 4 paragraph 4 requires for operating NIs, as a part of re-assessment after a certain period of time or as a part of periodic inspections of safety documents, to reassess effects of the above-mentioned external events, using the current technical standards and knowledge and taking into account potential changes in the location.

SÚJB shall, in agreement with Section 3 paragraph 2 letter k) and letter v) of the Atomic Act, provide to municipalities and District Offices data about RAW management on the territory they administrate and provide information under special regulations (Act No. 123/1999 Coll. as enacted by Act No. 132/2000 Coll., on the right for information about the environment and Act No. 106/1999 Coll., on free access to information) and elaborate once a year a report on its activities and submit it to the government and to the public.

Based on bilateral intergovernmental agreements with the Federal Republic of Germany and Austria the Czech Republic submits to the governmental bodies of these countries the information on its near-boarder NIs. The transmission of the information is performed both on regular basis (meetings held once a year), and on irregular basis at agreed meetings or in written form.

The Czech Republic has entered a general intergovernmental agreement about exchange of information concerning utilization of nuclear energy with another neighboring country – Slovakia. The obligation to inform about serious events in nuclear safety is contractually established also in an agreement on cooperation in state supervision of nuclear safety of nuclear installations and state supervision of nuclear materials between the Czech Republic and the Republic of Hungary.

8.3.1 Nuclear Power Plant Dukovany

At the moment EDU is not planning to site any additional facility for RAW management. Siting of the existing buildings and facilities for RAW management took place within the proceedings to site the entire NPP as described in the Initial Safety Report. A detailed description of the geographic location and protection against earthquake, floods, adverse climatic conditions, effects of aircraft crash, pressure waves from explosions and interventions by third persons is provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1, of February 2003.

8.3.2 Nuclear Power Plant Temelín

At the moment ETE is not planning to site any additional facility for RAW management. Siting of the existing buildings and facilities for RAW management took place in the proceedings to site the entire NPP as described in the Initial Safety Report.

Similarly as in case of EDU, more detailed information about the site and its protection against various natural and man-induced events is provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1, of February 2003.

8.3.3 SÚRAO

The Czech Republic anticipates to develop a DGR in granitic formations after 2065. More details about the issue are provided in 7.7.

8.3.4 ÚJV Řež a. s.

At the moment ÚJV Řež a. s. is not planning to site any additional facility for RAW management.

Siting of the existing buildings and facilities for RAW management (Building 241 and HLW storage facility) took place within the proceedings to site the entire nuclear installation under the valid legislation. Safety of the facilities has been reassessed in agreement with the Atomic Act and its implementing regulations, as required for the siting, design, construction and operation of nuclear installations.

8.4 Design and Construction of Facilities

Each Contracting Party shall take the appropriate steps to ensure that:

(i) the design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;

(ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a radioactive waste management facility other than a disposal facility are taken into account;

(iii) at the design stage, technical provisions for the closure of a disposal facility are prepared;

(iv) the technologies incorporated in the design and construction of a radioactive waste management facility are supported by experience, testing or analysis.

The legislative framework to permit construction of a nuclear installation from the viewpoint of nuclear safety and a radiation protection consists of the Atomic Act and its implementing regulations, particularly:

- Decree No. 195/1999 Coll., on requirements for nuclear installations to assure nuclear safety, radiation protection and emergency preparedness,
- Decree No. 214/1997 Coll., on quality assurance in activities associated with nuclear energy use and radiation practices and on establishing criteria for classification and categorization of classified equipment into safety classes,
- Decree No. 307/2002 Coll., on radiation protection,
- Decree No. 144/1997 Coll., on physical protection of nuclear materials and nuclear installations and their classification.

As stated in chapter 5.2.2, construction of a nuclear installation is an activity subject to a license by SÚJB in agreement with Section 9 paragraph 1, letter b) of the Atomic Act from the viewpoint of nuclear safety and radiation protection. All the following preconditions shall be met to issue a license for construction of a nuclear installation under Section 13 paragraphs 5 and 6 of the Atomic Act:

- Approved quality assurance program for the licensed activity,
- Approved quality assurance program for the designing,
- Approved proposal of a method to assure physical protection of the nuclear installation and nuclear materials.

An application for a license to construct RAW Repository and facilities for RAW management, which are a part of a nuclear installation, shall be supported with the following documents in agreement with Appendix B of the Atomic Act:

- Preliminary Safety Report which shall include
  - evidence that the proposed design meets all requirements for nuclear safety, radiation protection and emergency preparedness as laid down in implementing regulations,
  - safety analyses,
  - information on predicted lifetime of the nuclear installation,
  - assessment of nuclear waste generation and nuclear waste management during commissioning and operation of the installation or workplace being licensed,
  - concept of safe termination of operation and decommissioning of the installation or workplace being licensed, including disposal of nuclear waste,
  - concept for spent nuclear fuel management,
  - assessment of quality assurance during preparation for construction, method of quality assurance for the carrying out of construction work and principles of quality assurance for linking stages,
  - list of classified equipment.
- Proposed method of physical protection assurance.

After favorable assessment of the above-listed documents SÚJB will issue a license for construction of a nuclear installation while the list of classified equipment and proposed method of physical protection assurance shall be subject to SÚJB approval.

8.4.1 Nuclear Power Plant Dukovany

EDU is involved in preparation of input documents for installation of new equipment to treat sludge and ion exchangers. The process has been under way for several years. A schedule for commissioning of the process equipment is specified in a decision issued by SÚJB.

Decommissioning of facilities for RAW management is performed in agreement with the concept of EDU decommissioning. Conceptual plans for decommissioning of facilities for RAW management, and on as-needed basis also technical measures, are taken into account already in the designing stage.

8.4.2 Nuclear Power Plant Temelín

The basic design for ETE, and therefore also facilities for RAW management, was elaborated by the Czech designing organization Energoprojekt. The design was assessed in the early 1990s by independent experts in RAW management.

Their conclusions resulted in a fundamental revision of the entire system of RAW management. An overview of the implemented changes is provided in the National Report under the Joint Convention submitted by the Czech Republic, Revision 1.1, of February 2003.

Decommissioning of facilities for RAW management is addressed in agreement with the ETE decommissioning concept. Conceptual plans for decommissioning of facilities for RAW management are taken into account already in the designing stage, including adoption of technical measures on an as-needed basis.

8.4.3 SÚRAO

8.4.3.1 RAW Repository Richard

RAW repository Richard is designed to dispose institutional RAW containing artificial radionuclides.

The repository is situated on the northwestern edge of the Litoměřice cadastre area under the Bídnice hill.

In the past there were three limestone quarries in the location (now called Richard I - III) and there was an underground factory construction during the World War II. Limestone had been quarried here until 1960s by Čížkovické cementárny a vápenky.

In the early 1960s the mine work Richard II was identified as a potential repository for low-level RAW.

The repository is situated in a carbonate bank, with overlying and underlying clayey rocks.

The mine premises and disposal rooms are dry. The only leakage of underground water in the repository premises occurs in the entrance portal and from ventilation chutes. Additional water gets into the repository by condensation of water from forced ventilation. The seeping and condensing water in the repository are drained into the mine drainage system. The mine water from the Richard repository (in orders of tenths of liters per second) is drained through a system of retaining tanks into a public sewerage system. The mine water is monitored before it is discharged into the sewerage system.

Among other things, 13 drills were made in the Richard repository to monitor hydrogeologic conditions in the concerned area, 9 of which for monitoring purposes and the remaining ones for prospecting purposes.

The mine work is stable from the geotechnical viewpoint.

Based on the earlier performed prospecting works, regular geotechnical monitoring was introduced in 1992 in the location that focuses on the repository safety from the viewpoint of its stability.

Radiation protection is performed by monitoring in agreement with a monitoring program approved by SÚJB. A concept has been approved for the repository's decommissioning.

8.4.3.2 RAW Repository Bratrství

The Bratrství repository in Jáchymov is designed to dispose RAW consisting of or contaminated with natural radionuclides of the radium and thorium series. The repository was developed particularly to dispose leaking and disused radioactive sources from healthcare facilities.

The Bratrství repository has been developed from a part of abandoned underground premises in the former uranium mine Bratrství.

Two factors are specific for the repository operation:

- high humidity in the underground premises and a substantial flow rate of mine water nearby the disposal chambers,
- high concentration of radon decay products (however not generated by the disposed RAW, but by natural activity of the host environment) which makes it necessary to maintain a special regime.

The mine work is stable from the geotechnical viewpoint.

Based on earlier performed prospecting works, regular hydrological and geotechnical monitoring was introduced in 1992 in the location that focuses on the repository safety from the viewpoint of its stability.

Radiation protection is ensured by monitoring in agreement with a monitoring program approved by SÚJB. A concept has been approved for the repository's decommissioning.

8.4.3.3 RAW Repository Dukovany

RAW Repository Dukovany has been in permanent operation since 1995. It consists of 112 vaults arranged in four rows, each with 28 vaults sized 5,3 x 5,4 x 17,3 m. Four vaults make up 1 dilatation unit, with a free space between the dilatation units filled with wood-cement board. Each vault is covered with 14 sloping panels of three types. The engineering barriers in RAW repository are represented by the waste form itself (bitumen, compacted RAW), walls from reinforced concrete and asphalt-propylene layer. RAW repository Dukovany is situated above the underground water level and has a double drainage system.

The filled vaults are covered with concrete (and topped with a thick-wall PE), with a drain hose to release potential gases. Once the repository is filled the construction will be insulated from the top (to prevent rainwater from permeating).

Radiation protection is performed by monitoring in agreement with a monitoring program approved by SÚJB. A concept has been approved for the repository's decommissioning.

8.4.3.4 RAW Repository Hostím

RAW Repository Hostím developed in former limestone mine Alkazar near Beroun was in operation in 1959 - 1964. It was established based on the Governmental resolution 231/1979 and related resolutions by the ministry of chemical industry.

RAW is disposed in the repository in two galleries:

- Gallery A was adapted and used by the former ÚJF Řež (predecessor of ÚJV Řež a. s. and ÚJF AV ČR). The RAW was stored free (in tins, glass jars, air-conditioning filters),
- Gallery B was used by ÚVVVR Praha within the framework of the then established and state-subsidized system for gathering and disposal of RAW. The RAW was mostly stored in 60 l zinc-plated drums and some contaminated voluminous equipment was free stored.

The operation of the Hostím repository was terminated by a decision issued by the Regional Hygienic Officer in 1965, which anticipated the waste would be disposed here "forever". The resolution was in agreement with the then effectual regulations and the state took charge of the future safety of the Hostím repository. The repository has been closed since 1997.

The land over RAW Repository Hostím is administered by the Town Office in Beroun. The repository is now in the protected landscape area Český kras and the national preserve Karlštejn. The repository is not classified as an old mine work and therefore it is not supervised by the Ministry of the Environment. In 1990 the Hostím repository was included into the system of repositories provided for and funded by ČSKAE (due the state-guaranteed care for old loads).

8.4.4 ÚJV Řež a. s.

8.4.4.1 Building 241 – RAW Management Facility Velké zbytky

The design of the building 241 was elaborated in 1957, its construction was completed in 1962 and in 1963 it was put into operation. It was designed and provided with technology for treatment and processing of liquid and solid RAW. Since at that time the documents supporting building inspectors approval were secret the procedure was performed again in 1996 in agreement with Act No. 50/1976 Coll.

The design of refurbishment of the evaporation system was elaborated in 1987. The main technological units were delivered to ÚJV Řež a. s. in 1988. Preparatory installation works started in 1988, the installation of the new evaporator in agreement with the design adapted in 1988 started in 1989 and was completed in August 1990. Comprehensive non-active tests were performed in August – December 1990. After the comprehensive tests ČSKAE, based on a request made by ÚJV Řež a. s., approved in 1992 the evaporation system into trial operation. In 1994 SÚJB issued a decision to approve the Limits and conditions of the evaporation system for concentration of liquid RAW and approved its permanent operation.

The fragmentation and decontamination center was put into operation in 1995. The following safety-related documents were elaborated:

- Fragmentation and decontamination center, Building 241, Preliminary Safety Report, 1994,
- Pre-operational Safety Report for the Fragmentation and decontamination center, Building 241, 1996.

A concept has been approved for the facility's decommissioning.

8.4.4.2 Building 211/8 – HLW storage facility

The facility construction took place in 1981 – 1988 and later was modified based on the requirements made by ČSKAE and SÚJB. The facility construction was completed in 1995. The HLW storage facility was put into trial operation based on a resolution issued by SÚJB in 1995 for a period of one year and into permanent operation in 1997.

The Pre-operational Safety Report for the HLW storage facility (Building 211/8) from 1995 was elaborated as a part of documents submitted in 1995 by ÚJV Řež a. s. to support the application for trial operation of the store. The report included:

- data specification and initial information,

- an overview of data describing the project siting,
- monitoring of the surroundings and impact on the environment,
- description of the building and materials assumed to be stored,
- description of handling and transport of the materials and safety analyses.

The documents also included a preliminary proposal of a decommissioning method for the high-level waste storage facility.

After the submitted documents were favorably assessed SÚJB approved permanent operation of the high-level waste storage facility. At the same time SÚJB approved the limits and conditions for the permanent operation of the high-level waste storage facility.

A concept has been approved for the facility's decommissioning.

8.5 Assessment of Safety of Facilities

Each Contracting Party shall take the appropriate steps to ensure that:

(i) before construction of a radioactive waste management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;

(ii) in addition, before construction of a disposal facility, a systematic safety assessment and an environmental assessment for the period following closure shall be carried out and the results evaluated against the criteria established by the regulatory body;

(iii) before the operation of a radioactive waste management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

As described in the previous chapter 8.4., an applicant for a license for construction of a repository or RAW management facility, which is a part of a nuclear installation, shall meet the requirement specified in the chapter, i.e. to submit a preliminary safety report. The report shall include safety analyses and analyses of unauthorized handling of nuclear materials and ionizing radiation sources and evaluation of their consequences for the workers, population and the environment.

Any changes performed in the course of the operation, significant from the viewpoint of nuclear safety or radiation protection (e.g. refurbishment or innovation), are subject to a license under Section 9 paragraph 1 letter f) of the Atomic Act.

Decree No. 307/2002 Coll., on radiation protection, requires in Section 52 paragraph 5 the following: The meeting of requirements for radiation protection in disposal of RAW shall be demonstrated in safety analyses of potential consequences of RAW disposal. The safety analyses shall in a demonstrable and credible manner and based on knowledge of the potential repository location, evaluate the potential risks during the operation and after the repository is closed. The safety analyses are used to derive acceptability criteria for RAW disposal. Requirements for the content of safety reports are provided in SÚJB recommendations.

The criterion established by the regulatory body in Section 52 paragraph 6 Decree No. 307/2002 Coll. is the optimization constraint for safe disposal of RAW. The optimization limit for safe disposal of RAW is the efficient dose of 0.25 mSv per calendar year for individuals from the critical group of population. Other requirements for radiation protection assurance in RAW management are described in chapter 6.4 Operational Radiation Protection.

Before starting the operation, in addition to the application for a license, the applicant shall submit a preoperational safety report containing updated safety analyses and evaluation of impacts on the environment. More details are provided in 8.6.

8.5.1 Nuclear Power Plant Dukovany

Systematic safety assessments and evaluation of impacts on the environment have been performed of the RAW management facilities that are currently in operation, as appropriate for the risks represented by such facilities and covering their service lifetime in the scope and manner required by valid legislation. The assessment and evaluation are documented in the Pre-operational Safety Report.

For management of liquid RAW the causes of integrity defects in the considered system have been defined and evaluation has been performed of the final consequences and probability of the given initiation event and adverse impacts on the environment. The most serious incident, defined as leakage of radioactive materials, is damage of tanks with the liquid media. The event may occur only as a result of seismic event accompanied by destruction of the building structure and permeation by radioactive materials through all process and construction barriers. Calculation models have shown that even if conservative assumptions are used and for the scenario of leakage of all liquid RAW from the storage tanks into watercourses, an individual from a critical group of population will receive the effective dose 0.2 mSv/year. In the scenario of the waste leakage into the underground water the effective dose will be 0.04 mSv/year. The general limit for an individual from population is 1 mSv/year.

Another potential incident with a substantial impact on the environment is a fire of the bituminization line. Results of calculations of radiological impacts of the bituminization line fire have implied that even under the most conservative assumptions (the model e.g. anticipates that the person in the afflicted area will only eat food from the local sources) the individual effective dose for an individual from population will not exceed 0.2 mSv/year. Decree SÚJB No. 307/2002 Coll. defines a general limit for the population, as a sum of effective doses from external exposure and effective dose commitments from internal exposure at 1 mSv per calendar year.

The most significant incident in the management system for gaseous RAW (due to the maximum potential impact on the surroundings of the nuclear power plant) is a damaged integrity of the system of cleaning of technological venting in the main production building. Using a standard calculation model the annual effective dose for an individual from population is max. 20 µSv, which represents 2 % of the basic general limit 1 mSv/year.

8.5.2 Nuclear Power Plant Temelín

A systematic safety assessment and evaluation of impacts on the environment have were performed before the beginning of construction of the RAW management facilities that are currently in operation, as appropriate for the risks represented by such facilities and covering its service lifetime in the scope and manner required by valid legislation. The assessment and evaluation are documented in the Pre-operational Safety Report.

For management of liquid RAW the causes of integrity defects in the considered system have been defined and evaluation has been performed of the final consequences and probability of the given initiation event and adverse impacts on the environment. The most serious incident, defined as leakage of radioactive materials, is damage of tanks with the liquid media. The event may occur only as a result of seismic event accompanied by destruction of the building structure and permeation by radioactive materials through all process and construction barriers. Calculation models have shown that even if conservative assumptions are used and for the scenario of leakage of all liquid RAW from the storage tanks into watercourses, an individual from a critical group of population will receive an effective dose 0.1 mSv/year. In the scenario of the waste leakage into the underground water the effective dose will be 0.03 mSv/year. The general limit for an individual from population is 1 mSv/year.

Another potential incident with a substantial impact on the environment is a fire of the bituminization line. Results of calculations of radiological impacts of the bituminization line fire have implied that even under the most conservative assumptions (the model e.g. anticipates that the person in the afflicted area will only eat food from the local sources) the individual effective dose for an individual from population will not exceed 0.02 mSv/year. Decree SÚJB No. 307/2002 Coll. defines a general limit for the population as a sum of effective doses from external exposure and effective dose commitment from internal exposure at 1 mSv per calendar year.

The most significant incident in the management system for gaseous RAW (due to the maximum potential impact on the surroundings of the nuclear power plant) is a damaged integrity of the system of cleaning of technological venting in the main production building. Using a standard calculation model the annual effective dose for an individual from population is max. 2 μSv which represents 0,2 % of the basic general limit 1 mSv/year.

8.5.3 SÚRAO

8.5.3.1 RAW Repository Richard

A revision of safety analyses for RAW repository Richard was prepared in 2003 which is a continuation of safety analyses and their revisions performed in 1995, 1998 and 1999 and used as supporting documents for the application for a license to operate the repository.

The safety analyses performed in 2000–2003 were supposed to verify the repository capacity and to reassess the already proposed decommissioning. The efforts included safety evaluations for options with and without a backfilling material in the repository premises, taking into account the updated information on the source term, including RAW inventory and employment of different types of filling materials, particularly bentonites and materials on cement basis.

The transport model has been updated using data from the newly made drill holes to further specify hydrogeologic data in the location.

Safety analyses evaluate the individual doses received by persons in the following scenarios:

- transport of radionuclides in the repository and underground water in case of barriers damage,
- scenario in which persons enter the repository and scenario with the persons stay in the location.

The transport of radionuclides was considered in two variants – with and without a backfilling material. The scenarios were anticipated to take place after termination of institutional control, i.e. 300 year after the operation of the facility is finished. Individual doses calculated for the real repository system (inventory, construction design, host rock environment) were compared with the applicable limits and acceptance criteria for RAW in RAW repository Richard Litoměřice have been proposed based on their comparison.

8.5.3.2 RAW Repository Bratrství

The safety analyses performed in 2000–2003 were supposed to verify the repository capacity and to propose limits and conditions for its operation. The efforts included safety evaluations for options with and without a backfilling material in the repository premises, taking into account the updated information on the source term, including RAW inventory and employment of different types of filling materials, particularly bentonites and materials on cement basis.

The safety analyses evaluate individual personal doses in the following scenarios: transport of radionuclides in the repository and underground water in case of barrier damage, scenario in which persons enter the repository and scenario with the persons stay in the location. The transport of radionuclides was considered in two variants – with and without a backfilling material. The scenarios were anticipated to take place after termination of institutional control, i.e. 300 year after the operation of the facility is finished. Individual doses calculated for the real repository system (inventory, construction design, and host rock environment) were compared with the applicable limits and acceptability criteria for RAW in the Bratrství repository have been proposed based on the comparison.

8.5.3.3 RAW Repository Dukovany

A license to operate the repository was issued based on safety analyses (Operational Safety Report) and the trial operation in 1995.

In 2002 new safety analyses were completed that were based on operational experience in the repository. The analyses were used to update the acceptability criteria for RAW Repository Dukovany in connection with other potential forms of RAW to be disposed here. The earlier variants of safety analyses anticipated that the concentrate from NPP operation will be immobilized in bitumen or cement. Due to the need to dispose ion exchangers, sludge and wastes from decommissioning of both the NPPs the safety analyses were extended to include an analysis of potential disposal of other waste types. Subsequently, waste acceptance criteria have been formulated for solidified and non-solidified RAW and the inventory of monitored radionuclides has been updated to take into account potential hazards of the whole range of the produced radionuclides.

The safety analyses evaluate individual personal doses in the following three scenarios: bath-tubbing, transport of radionuclides in the repository and underground water in case of barrier damage, scenario in which persons enter the repository and scenario with persons stay in the location. The scenarios were anticipated to take place after termination of institutional control, i.e. 300 year after the operation of the facility is finished. Individual doses calculated for the real repository system (inventory, construction design, host rock environment) were compared with the applicable limits and acceptance criteria for RAW in the RAW Dukovany repository have been proposed based on their comparison. The acceptance criteria are formulated separately for solidified and non-solidified wastes.

8.5.3.4 RAW Repository Hostím

In 1991 - 1994 an inventory was taken of the disposed RAW, and radiation and mining survey was performed inside both the galleries (the information was physically checked that sources and containers with high activity had been in 1964 moved from the gallery B into the repository Richard Litoměřice). Hydrogeologic evaluation of the location was performed, evaluation of potential accident scenarios and a monitoring system was developed (surface and underground water, geotechnical stability).

The performed analyses have implied that the risks associated with reprocessing and transport of the RAW into another location would be significantly higher than those associated with the existing repository. The repository has been filled with a concrete mixture and closed.

8.5.4 ÚJV Řež a. s.

8.5.4.1 Building 241 – RAW Management Facility Velké zbytky

Safety evaluation of the facility was performed before the construction start, in agreement with legal regulations valid at the time of the construction.

Safety evaluation of the evaporation system and fragmentation and decontamination center was performed and approved by SÚJB. The following documents were submitted to SÚJB to support the license issue:

- Pre-operational Safety Report for the evaporation system for concentration of liquid radioactive waste, 1992,
- Pre-operational Safety Report for the fragmentation and decontamination center (Building 241), 1996.

8.5.4.2 Building 211/8 – HLW Storage Facility

Safety evaluation of the facility was performed before the construction start, in agreement with legal regulations valid at the time of the construction.

The following reports deal with the safety evaluation:

- Preliminary Safety Report – HLW storage facility in ÚJV Řež a. s., ÚJV 1987,
- Pre-operational Safety Report for the HLW storage facility, Building 211/8, 1995, 2002.

8.6 Operation of Facilities

Each Contracting Party shall take the appropriate steps to ensure that:

(i) the license to operate a radioactive waste management facility is based upon appropriate assessments as specified in Article 15 and is conditional on the completion of a commissioning program demonstrating that the facility, as constructed, is consistent with design and safety requirements;

(ii) operational limits and conditions, derived from tests, operational experience and the assessments as specified in Article 15 are defined and revised as necessary;

(iii) operation, maintenance, monitoring, inspection and testing of a radioactive waste management facility are conducted in accordance with established procedures. For a disposal facility the results thus obtained shall be used to verify and to review the validity of assumptions made and to update the assessments as specified in Article 15 for the period after closure;

(iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a radioactive waste management facility;

(v) procedures for characterization and segregation of radioactive waste are applied;

(vi) incidents significant to safety are reported in a timely manner by the holder of the license to the regulatory body;

(vii) programs to collect and analyze relevant operating experience are established and that the results are acted upon, where appropriate;

(viii) decommissioning plans for a radioactive waste management facility other than a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body;

(ix) plans for the closure of a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body.

The legislative framework for the license to operate RAW repositories and facilities for RAW management in NIs from the viewpoint of nuclear safety and radiation protection consists of the Atomic Act and its implementing regulations, particularly:

- Decree No. 106/1998 Coll., on nuclear safety assurance of nuclear installations during their commissioning and operation,
- Decree No. 214/1997 Coll., on quality assurance in activities associated with nuclear energy use and radiation practices and on establishing criteria for classification and categorization of classified equipment into safety classes,
- Decree No. 307/2002 Coll., on radiation protection,
- Decree No. 144/1997 Coll., on physical protection of nuclear materials and nuclear installations and their classification,

- Decree No. 318/2002 Coll., on details for assurance of emergency preparedness at nuclear installations and workplaces with sources of ionizing radiation and on requirements for the content of on-site emergency plans and of emergency rules.

As stated in chapter 5.2.2, the commissioning and operation of RAW repositories and RAW management facilities in NIs are activities subject to the SÚJB license under Section 9, paragraph 1, letters c) and d) of the Atomic Act. A precondition of such licenses for commissioning and operation of a nuclear installation under Section 13, paragraph 5 of the Atomic Act is an approved quality assurance program, method of physical protection assurance for the nuclear installation and nuclear materials and on-site emergency plan.

RAW repository and RAW management facilities in nuclear installations are commissioned gradually, starting with a trial operation for which the applicant shall submit the following:

- Pre-operational safety report which shall contain:
  - description of changes in the original design assessed in the preliminary safety report and evidence that the level of nuclear safety has not been lowered,
  - additional and specific evidence about the assurance of nuclear safety and radiation protection,
  - limits and conditions for safe operation of the repository and RAW management and facility in a nuclear installation,
  - method of RAW management,
  - evaluation of quality of classified equipment,
- Other documents which shall contain:
  - schedule of works,
  - program of works,
  - evidence that previous SÚJB resolutions and conditions have been met,
  - evidence of the personnel preparedness,
  - on-site emergency plan,
  - method of physical protection assurance,
  - program of operating inspections.

An application for a license to operate shall be supported under Appendix D of the Atomic Act with the following documents:

- amendments to the preoperational safety report,
- evaluation of results of the trial operation,
- evidence that previous SÚJB decisions and conditions have been met,
- evidence of preparedness of the equipment and personnel,
- schedule of operation,
- updated limits and conditions for safe operation,
- proposed method of decommissioning,
- estimate of decommissioning costs.

After the above-mentioned documents are favorably assessed SÚJB will issue a license for operation of a NI, while changes in the documents approved in the earlier stages shall be approved by SÚJB separately. The limits and conditions for safe management of RAW, which is a document to be approved under J.9 Appendix to the Atomic Act, shall be established based on safety analyses and under Section 53 of Decree No. 307/2002 Coll. shall include particularly the following:

- data on the permissible parameters which assure nuclear safety and radiation protection of the management,
- methods and times of their measurement and evaluation,
- requirements for operating capability of the facility for RAW management,
- requirements for setup of protection systems of the facility,
- limits of the conditional quantities,
- requirements for activities performed by workers and organizational measures to meet all defined conditions for the design operating situations.

RAW may be managed only by a licensee under Section 9 paragraph 1 letter j) of the Atomic Act. The license may be issued only based on a favorable assessment of documents required by the same Act and based on favorable results of inspections and may be issued only if the applicant is the licensee under Section 9 paragraph 1 letter i) for management of sources of ionizing radiation.

8.6.1 Nuclear Power Plant Dukovany

EDU is a holder of the license for RAW management under Section 9 paragraph 1, letter j) of the Atomic Act. This means that all requirements have been met for safe management of RAW as specified in the Atomic Act and its implementing regulations, particularly Decree No. 307/2002 Coll.

The limits and conditions for management of RAW are defined based on safety analyses and approved by SÚJB as part of documents to obtain a license for RAW management. The prescribed period for their revising is 4 years.

Internal procedures for operation, maintenance, monitoring, inspections and tests of facilities for RAW management are developed in agreement with the procedures specified in the Atomic Act and its implementing regulations and they are a part of documents supporting an application for the license to manage RAW. The monitoring program shall be approved by SÚJB.

The requirement for technical and engineering support is established in ČEZ, a. s. internal documents and is a part of the corporate strategy.

In EDU the procedures for characterization and sorting of RAW are described in the internal regulations inspected by SÚJB. The regulations comply with the requirements of Decree No. 307/2002 Coll. for sorting and characterization of RAW.

The obligation of the licensee holding a license for RAW management to promptly report accidents important from the viewpoint of nuclear safety and radiation protection is established in the Atomic Act. In EDU the reporting procedures are described in the internal regulations dealing with emergency preparedness.

Programs for accumulation and analyses of significant operating experience are used in EDU in all operating areas, i.e. also in RAW management. Outputs from the analyses are routinely used to modify the related procedures.

In 2004 two inspections of RAW management were conducted at EDU, which concentrated on compliance with limits and conditions for safe RAW management and on compliance with Sections 48 – 51 and 53 – 55 of Decree No. 307/2002 Coll. on radiation protection. Results of the inspections did not indicate violation of the above mentioned regulations.

A proposed method of NPP decommissioning is approved by SÚJB as a part of the license to operate the plant. The document content complies with the requirements of Decree No. 185/2003 Coll. Meanwhile, the costs of decommissioning are verified and EDU is creating a financial reserve for the decommissioning. A proposal for decommissioning is under Decree No. 185/2003 Coll. approved for five years. Also the verification of decommissioning costs is valid for the same period of time. The proposal for decommissioning also includes facilities for RAW management.

8.6.2 Nuclear Power Plant Temelín

ETE is a holder of the license for RAW management under Section 9 paragraph 1, letter j) of the Atomic Act. This means that all requirements have been met for safe management of RAW as specified in the Atomic Act and its implementing regulations, particularly Decree No. 307/2002 Coll.

The limits and conditions for management of RAW are defined based on safety analyses and approved by SÚJB as part of documents to obtain license for RAW management. The prescribed period for their revising is 4 years.

Internal procedures for operation, maintenance, monitoring, inspections and tests of facilities for RAW management are developed in agreement with the procedures specified in the Atomic Act and its implementing regulations and they are a part of documents supporting an application for the license to manage RAW. The monitoring program shall be approved by SÚJB.

The requirement for technical and engineering support is established in ČEZ, a. s. internal documents and is a part of the corporate strategy.

In ETE the procedures for characterization and sorting of RAW are described in the internal regulations inspected by SÚJB. The regulations comply with the requirements of Decree No. 307/2002 Coll. for sorting and characterization of RAW.

The obligation of the licensee holding a license for RAW management to promptly report accidents important from the viewpoint of nuclear safety and radiation protection is established in the Atomic Act. In ETE the reporting procedures are described in the internal regulations dealing with emergency preparedness.

Programs for accumulation and analyses of significant operating experience are used in ETE in all operating areas, i.e. also in RAW management. Outputs from the analyses are routinely used to modify the related procedures.

In 2004 three inspections of RAW management were conducted at ETE which concentrated on compliance with limits and conditions for safe RAW management and compliance with Sections 48 – 51 and 53 – 55 of Decree No. 307/2002 Coll., on radiation protection, and on compliance with requirements of Decree No. 214/1997 Coll. on quality assurance. Results of the inspections did not indicate violation of the above mentioned regulations.

A proposed method of NPP decommissioning is approved by SÚJB as a part of the license to operate the plant. The document content complies with the requirements of Decree No. 185/2003 Coll. Meanwhile, the costs of decommissioning are verified and ETE is creating a financial reserve for the decommissioning. The proposal for decommissioning is under Decree No. 185/2003 Coll. approved for five years. Also the verification of decommissioning costs is valid for the same period of time. The proposal for decommissioning also includes facilities for RAW management.

8.6.3 SÚRAO

8.6.3.1 RAW Repository Richard

The repository's safety has been assessed using requirements of Act No. 28/1984 Coll. and its implementing regulations and subsequently in agreement with Atomic Act No. 18/1997 Coll. and its implementing regulations.

As disposal of RAW in underground premises represents a special interference in the earth's crust the safety evaluation of the repository took into account also Section 34 paragraph 1 of Act No. 44/1988 Coll.

The repository is operated in a standard manner in agreement with the operating regulations, with the limits and conditions for safe operation with the acceptability conditions. Current maintenance is performed in the underground part of the mine and in the surface facilities.

The volume activity of mine water is monitored in agreement with the monitoring program in samples collected at the repository entrance and in the retaining tank. The results of monitoring demonstrate that the volume activity limits in mine water have not been exceeded in the course of the monitored period.

Volume activity of ^{3}H radionuclide in the atmosphere

The volume activity of ^{3}H has been monitored in three points in the repository and the following maximums were measured in 2004:

in front of room No. 18 $1{,}7.10^{3}$ Bq/m^{3}

The limit volume activity for the repository atmosphere is 3.10^{4} Bq/m^{3}.

Limit of Rn equivalent volume activity intake in the atmosphere

Average EOAR levels are considered separately for premises with increased radon concentration and for other premises. Limit EOAR values are specified at 3000 Bq/m^{3} in locations with increased radon concentration and at 1500 Bq/m^{3} in other premises. Exposure times of workers were monitored in months for each type of the premises and the maximum time spent in either type of the premises was shorter than 300 hours per year in 2002-2004. The measured EOAR values were from 780 Bq/m^3 to 16 300 Bq/m^3.

Maximum intake

The maximum intake of radon for a worker in the course of 2004 was 0.68 MBq, which corresponds to the dose 4.56 mSv. The annual intake of equivalent volume activity from radon received by the repository workers shall not exceed 3 MBq.

In connection with the limits and conditions for safe operation verification is performed of electric equipment operability, forklift truck operability, passability of the drainage system and operability of the instrumentation.

Since the beginning of the operation RAW has been always disposed in agreement with the acceptability criteria valid in the given period. When disposing the waste the operator checks it for the following:

- damage of the container,
- surface contamination of the container,
- dose rate equivalent on the container surface,
- content of radionuclides.

The individual containers are placed in disposal rooms.

Individual containers are stored to maximize utilization of the space in the rooms, in 5 layers (from the viewpoint of strength capacity up to 8 layers may be stacked without damage of the bottom layer of the casks).

In addition to the monitoring of parameters important from the viewpoint of radiation protection, also basic climatic and hydrological data and geotechnical parameters are measured in the location.

The RAW in which the content of radionuclides exceeds the acceptance criteria for disposal are, in agreement with the limits and conditions for storage of RAW, stored in rooms separated from the disposal rooms (this concerns particularly the radionuclides ^{60}Co, ^{137}Cs, ^{241}Am, ^{238}Pu and ^{239}Pu).

In 2004 two inspections of RAW management were conducted at the Richard repository which concentrated on compliance with limits and conditions for safe RAW management, acceptance conditions for disposal and acceptance conditions for storage and on compliance with Sections 52 – 55 of Decree No. 307/2002 Coll., on radiation protection. Results of the inspections did not indicate violation of the above mentioned regulations.

Tab. 8.1 Summary data on RAW Repository Richard

Beginning of operation	1964
End of operation	2070
Repository depth under the surface	70 - 90 m
Total volume adapted for the repository	17 050 m^3
Filled volume	6 260 m^3 (net volume of disposed RAW 2 152 m^3)
Free volume	2 040 m^3 (filling rate ca. 35 %)
Access tunnel and other communications (including that to Richard I)	8 750 m^3
Activity converted as in 2004	see chapter 4.2.3.1.

8.6.3.2 Repository Bratrství

The repository's safety has been assessed using requirements of Act No. 28/1984 Coll. and its implementing regulations and subsequently in agreement with Atomic Act No. 18/1997 Coll. and its implementing regulations.

Utilization of underground premises for RAW disposal is classified as a special interference in the earth's crust and a decree issued by ČBÚ establishes basic obligations for its operation. These requirements extend requirements resulting from the Atomic Act particularly with the following:

- monitoring of geotechnical parameters of the underground premises,
- monitoring of airstreams.

A standard container used for RAW disposal has been a sandwich disposal unit with the volume of 200 l with anticorrosion finish. The drums are laid down flat in layers up to ca. 2 m.

The monitoring of the repository, persons, surroundings and effluences is performed in agreement with the monitoring program for the Bratrství repository approved by SÚJB. Inspections in the repository are performed on regular basis in agreement with the monitoring program, as well as in connection with working activities on as-needed basis. The inspections focus particularly on activity of mine water from ^{226}Ra and radon transformation products and air activity from radon transformation products. The air in the repository is monitored based on a contract with SÚJCHBO Příbram – Kamenná. Analyses of discharged water and water samples from the workplace and its surroundings are performed in SÚRO laboratories on a contractual basis.

The RAW disposed in the Bratrství repository is mostly $RaSO_4$ in platinum cases (medical sources), Ra-Be neutron sources, laboratory waste containing natural radionuclides, depleted uranium and natural thorium (mostly as $Th(NO_3)_4.5H_2O$ a ThO_2).

The overall inventory of selected radionuclides disposed in the repository shall not exceed 2.10^{12} Bq of natural radionuclides.

By now the following activity of natural radionuclides has been disposed in the Bratrství repository (see chapter 4.2.3.2):

Tab. 8.2 Summary data about the Bratrství repository

Beginning of operation	1972
Scheduled end of operation	2030
Repository depth under the surface	over 50 m
Total volume adapted for the repository	3 500 m^3 (the anticipated storage layer is 2 m, however it may be more in rooms No. 1, 4 and 5)
Filled volume	880 m^3 (net volume of disposed RAW 264 m^3)
Free volume	320 m^3 (filling rate ca. 30 %)
Activity converted as in 2004	see chapter 4.2.3.2

In 2004 one inspection of RAW management was conducted at the Bratrství repository which concentrated on compliance with limits and conditions for safe RAW management, acceptance conditions for disposal and on compliance with Sections 52 – 55 of Decree No. 307/2002 Coll., on radiation protection. Results of the inspection did not indicate violation of the above mentioned regulations.

8.6.3.3 RAW Repository Dukovany

The repository's safety has been assessed using requirements of Act No. 28/1984 Coll. and its implementing regulations and subsequently in agreement with Atomic Act No. 18/1997 Coll. and its implementing regulations.

The limits and conditions for safe operation define conditions in which the repository may be operated:

- the tanks are monitored for presence of water,
- drainage water from inspection tanks is monitored,
- clearness of the drainage system is checked (once a year),
- the instrumentation is checked for operating ability.

The acceptance criteria establish requirements for the form of the disposed RAW, including the activity. The exclusive type of container used in the repository are 200 l drums of zinc-plated sheet which are regularly visually inspected at the receiving inspection of the RAW.

Every receiving inspection of RAW includes evaluation of compliance with activity limits for the monitored radionuclides.

Tab. 8.3 Summary data on RAW Repository Dukovany

Beginning of operation	1995
Scheduled end of operation	2100
Repository depth under the surface	0 m
Total volume adapted for the repository	55 000 m^3
Filled volume	4 733 m^3
Free volume	50 267 m^3 (filling rate ca. 8.5 %)
Activity converted as in 2004	see chapter 4.2.3.3

In 2004 two inspections of RAW management were conducted at the Dukovany repository which concentrated on compliance with limits and conditions for safe RAW management, acceptance conditions for disposal and on compliance with Sections 52 – 55 of Decree No. 307/2002 Coll., on radiation protection. Results of the inspections did not indicate violation of the above mentioned regulations.

8.6.3.4 RAW Repository Hostím

The repository was closed based on the performed safety analyses in 1997.

The following activities were performed in 1991 - 1994:

- inventory-taking of the disposed RAW (based on the available records),
- radiation and mining survey inside both the galleries (the information was physically checked that sources and packagings with high activity had been in 1964 moved from the gallery B into the repository Richard),
- hydrogeologic evaluation of the location,
- evaluation of potential accident scenarios,
- a monitoring system has been created (surface and underground water, geotechnical stability).

The performed analyses have implied that the risks associated with reprocessing and transport of the RAW into another location would be significantly higher than those associated with immobilization of the disposed waste. Therefore the repository has been filled with a concrete mixture and closed.

At the moment the repository is in the regime of institutional control. The control has not identified any release of radioactive materials from the repository premises into the environment.

Tab. 8.4 Summary data on RAW Repository Hostím

Beginning of operation	1959	
End of operation	1964	
Final sealing	1997	
Repository depth under the surface	Ca. 30 m	
	Gallery A	**Gallery B**
Repository volume	ca. 470 m^3	1220 m^3
Total volume of disposed RAW	ca. 1/3 of the gallery	200 m^3
Activity converted as in 1991-1997	see chapter 4.2.3.4	see chapter 4.2.3.4

8.6.4 ÚJV Řež a. s.

8.6.4.1 Building 241 – RAW Management Facility Velké zbytky

SÚJB has issued the following licenses concerning operation of the facility in the Building 241 Velké zbytky:

- license for operation of a workplace with significant sources of ionizing radiation, license for handling of sources of ionizing radiation from 1999,
- license for RAW management, which covers gathering, sorting, treatment, processing and storage of RAW, the license from 2004 approves the limits and conditions for RAW management ÚJV Řež a. s.

RAW management in ÚJV Řež a. s. is further governed by the following internal procedures:

- RAW management in ÚJV Řež a. s. (2001),
- Radiation protection (1999, revision 2001),
- Rules of Organization ÚJV Řež a. s. (2000),
- Metrological Manual ÚJV Řež a. s. (2001),
- Monitoring program ÚJV Řež a. s. (2001),
- On-site emergency plan ÚJV Řež a. s. (2001),
- Accounting for ionization radiation sources in ÚJV Řež a. s. (1999),
- System of employees training in radiation protection and nuclear safety in ÚJV Řež a. s. (1999).

The limits and condition for radioactive management have been approved by SÚJB.

8.6.4.2 Building 211/8 – HLW Storage Facility

SÚJB has issued the following licenses concerning operation of the HLW storage facility:

- license for operation of a workplace with very significant sources of ionizing radiation, i.e. a workplace with HLW storage facility – Building 211/8,
- license for operation of a nuclear installation – a workplace with HLW storage facility at the site of ÚJV Řež a. s.
- license to perform refurbishment of the HLW storage, building 211/8, including construction adjustments and construction of a hot cell, repackaging of EK-10 fuel and increase of the pool storage capacity.

A resolution issued by SÚJB has approved limits and conditions for operation of HLW storage facility (Building 211/8).

Management of RAW and sealed sources:

ÚJV Řež a. s. is a research organization capable of providing engineering and technical support for activities it performs, including RAW management. Some activities have been contracted by ÚJV Řež a. s. to entities with necessary qualification.

The system for RAW management includes a sorting process, which has a decisive effect on the efficiency of RAW processing. The sorting process features the following key parameters:

- type of material and outer dimensions,
- nature of contamination:
  - level of contamination,
  - nature (type) of contaminants,
  - nature of contaminants fixation on the surface.

The parameters for sorting of RAW into groups (classes) then determine further processing and selection of methods to process the waste.

Subsequently, the RAW is sorted based on its nature as follows:

- solid low- and intermediate-level RAW, further divided into:
  - compressible,
  - non- compressible,
- solid low- and intermediate-level RAW,
- solid HLW,
- special RAW.

The criteria for RAW sorting into groups are derived from a method for processing of the waste and from the acceptance criteria for storage and disposal.

RAW is sorted based on the composition of contaminating radionuclides into the following classes:

- waste contaminated with artificial beta and gamma radionuclides,
- waste contaminated with alpha radionuclides,
- waste contaminated with natural radionuclides.

For special RAW additional sorting may be performed, based on processing requirements and disposal conditions, e.g.:

- organic solvents, oils, oil products,
- used sealed radionuclide sources,
- RAW contaminated with alpha radionuclides,
- liquid RAW contaminated with tritium.

The system for handling of ionizing radiation sources includes emergency preparedness, which is an ability to recognize occurrence of an extraordinary radiation situation and at its occurrence to perform measures specified by emergency plans. An emergency plan is a set of planned measures to liquidate a radiation accident or radiation emergency and to limit their consequences. The following documents have been elaborated and approved by SÚJB for the mentioned purposes:

- On-site emergency plan ÚJV Řež a. s. No.1/2000, Cat. No. 3.9.1., Edition No. 2, Revision No. 0, valid from 15 February 2001 to 31 March 2006,
- On-site emergency plan for operation of workplaces of the operation Disposal of RAW,

- On-site emergency plan for operation of High-level Waste Storage Facility, Building 211/8, Cat. No. 3.9.1.3., Edition No. 1, Revision No. 0, valid since 28 February 2001.

Records are kept about the RAW managed in ÚJV Řež a. s., i.e. quantities and specific activities of radionuclides in the waste. Also operating records are kept and maintained on RAW management. The data are regularly once a year sent to SÚJB, in agreement with the valid legislation and the concerned SÚJB licenses.

Regulations about keeping and maintenance of the data are specified in the following Quality Assurance Programs:

- Quality assurance program for RAW management, Cat. No. o 4.2.6 / 406, Edition No. 2, valid since 4 June 2001,
- Quality assurance program for operation of the High-level waste storage facility, Cat. No. 4.2.8/406, Edition No. 1, Revision No. 1. valid since 4 September 2000.
- Quality assurance program, Implementation of refurbishment of the high-level waste storage facility – building 211/8, Edition No. 1, Revision No. 0, Cat. No.: 4.2.43/315 of 24 July 2003.

In 2004 two inspections of RAW management, including waste from rehabilitation of old environmental liabilities, were conducted in ÚJV Řež a. s., which concentrated on compliance with limits and conditions for safe RAW management and on compliance with Sections 48 – 51 and 53 – 55 of Decree No. 307/2002 Coll., on radiation protection. Results of the inspections did not indicate violation of the above mentioned regulations.

Decommissioning Programs

The following proposals for decommissioning have been developed and approved by SÚJB:

- Proposed decommissioning method for the high-level waste storage facility (High-level waste storage facility - Building 211/8), Cat. No. 3.9.8.-3/HLW, Edition No. 1, Revision No. 0,
- Proposed decommissioning method for workplaces in Building 241 "Velké zbytky" (RAW management facility), Cat. No.: 3.9.8 - 4/VZ, Edition No. 1, Revision No. 0.

8.7 Institutional Measures after Closure

Each Contracting Party shall take the appropriate steps to ensure that after closure of a disposal facility:

(i) records of the location, design and inventory of that facility required by the regulatory body are preserved;

(ii) active or passive institutional controls such as monitoring or access restrictions are carried out, if required;

The Atomic Act defines in Section 18 paragraph 1) the following obligations, among others:

a licensee shall also

- *keep and archive records of ionizing radiation sources, facilities, materials, activities, quantities and parameters and other facts impacting on nuclear safety, radiation protection, physical protection and emergency preparedness, and submit the recorded information to the Office in the manner set out in an implementing regulation;*

- *keep records of radioactive waste by type of waste in such a manner that all characteristics affecting its safe management are apparent;"*

The state guarantees under the conditions in Section 25 of the Atomic Act safe disposal of all RAW, including monitoring and inspections of repositories even after their closure. Responsibility for the monitoring of repositories is defined in Section 26 paragraph 3 of the Atomic Act, which I, among other things, says: *„The Authority shall engage in preparation, construction, commissioning, operation and closure of radioactive waste repositories and monitoring of their impact on the environment"*.

8.7.1 SÚRAO

8.7.1.1 RAW Repository Richard

A method to close the repository is provided in the proposal of a decommissioning method approved by SÚJB. It is anticipated that disposal chambers and access tunnels will be filled with a mixture based on cements or clayey sealing material. Institutional control is anticipated for a period of 300 years after the operation is terminated. A monitoring program for a period after the closure has not yet been proposed.

8.7.1.2 RAW Repository Bratrství

A method to close the repository is provided in the proposal of a decommissioning method approved by SÚJB. It is anticipated that disposal rooms and access tunnels will be filled with a mixture based on bentonites or cement. Institutional control is anticipated for a period of 300 years after the operation is terminated. A monitoring program for a period after the closure has not yet been proposed.

8.7.1.3 RAW Repository Dukovany

A method to close the repository is provided in the proposal of a decommissioning method approved by SÚJB. Application of layers of sealing materials is anticipated to cover the repository. Institutional control is anticipated for a period of 300 years after the operation is terminated. A monitoring program for a period after the closure has not yet been proposed.

8.7.1.4 RAW Repository Hostím

Free space in the repository was sealed in 1997 (filled with concrete) to assure:

- access is prevented to the disposed RAW and the repository premises,
- long-term stabilization of the respective part of the mine work,
- increased efficiency of the existing barriers against penetration by water and potential spreading of contamination into the environment.

The monitoring program includes ten sampling points (underground and surface water) in the repository surroundings.

9. Transboundary Movement – Article 27 of the Joint Convention

1. *Each Contracting Party involved in transboundary movement shall take the appropriate steps to ensure that such movement is undertaken in a manner consistent with the provisions of this Convention and relevant binding international instruments.*

   In so doing:

   (i) a Contracting Party which is a State of origin shall take the appropriate steps to ensure that transboundary movement is authorized and takes place only with the prior notification and consent of the State of destination;
   (ii) transboundary movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilized;
   (iii) a Contracting Party which is a State of destination shall consent to a transboundary movement only if it has the administrative and technical capacity, as well as the regulatory structure, needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention;
   (iv) a Contracting Party which is a State of origin shall authorize a transboundary movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph (iii) are met prior to transboundary movement;
   (v) a Contracting Party which is a State of origin shall take the appropriate steps to permit re-entry into its territory, if a transboundary movement is not or cannot be completed in conformity with this Article, unless an alternative safe arrangement can be made.

2. *A Contracting Party shall not license the shipment of its spent fuel or radioactive waste to a destination south of latitude 60 degrees South for storage or disposal.*

3. *Nothing in this Convention prejudices or affects:*

   (i) the exercise, by ships and aircraft of all States, of maritime, river and air navigation rights and freedoms, as provided for in international law;
   (ii) rights of a Contracting Party to which radioactive waste is exported for processing to return, or provide for the return of, the radioactive waste and other products after treatment to the State of origin;
   (iii) the right of a Contracting Party to export its spent fuel for reprocessing;
   (iv) rights of a Contracting Party to which spent fuel is exported for reprocessing to return, or provide for the return of, radioactive waste and other products resulting from reprocessing operations to the State of origin.

9.1 Report on the Current Transboundary Movement of SF and RAW

Since 1 January 1993, the founding date of the Czech Republic, there has been no transboundary movement of RAW and since 30 October 1997 there has been no transboundary movement of SF and RAW.

The import of RAW is prohibited by Section 5 paragraph 3 of the Atomic Act:

„An import of radioactive waste into the territory of the Czech Republic, with the exception of the re-import of ionizing radiation sources produced in the Czech Republic or radioactive waste originated from materials exported from the Czech Republic for the purpose of their processing or reprocessing having been approved by the Office, is prohibited."

International transport of RAW RAW (i.e. only its transit or export) is subject to a license by SÚJB under Section 9 paragraph 1 letters m) and p) of the Atomic Act and the method of transport is governed by provisions of Section 7 through 10 Decree No. 317/2002 Coll., on type-approval of packages for transport, storage and disposal of nuclear materials and radioactive substances, on type-approval of ionizing radiation sources and transport of nuclear materials and specified radioactive substances (on type-approval and transport).

Provisions of Sections 8 and 9 Decree No. 317/2002 Coll. establish requirements for transport of radioactive materials in general and are fully compatible with requirements of Council Directive:

- Council Directive 94/55/EC of 21 November 1994 on the approximation of the laws of the Member States with regard to the transport of dangerous goods by roads amended by Commission Directive 2001/7/EC of 29 January 2001 adapting for the third time to technical progress Council Directive 94/55/EC on the approximation of the laws of the Member States with regard to the transport of dangerous goods by road,
- Council Directive 96/49/ECof 23 July 1996 on the approximation of the laws of the Member States with regard to the transport of dangerous goods by rail as amended by Commission Directive 2001/6/EC of 29 January 2001 adapting for the third time to technical progress Council Directive 96/49/EC on the approximation of the laws of the Member States with regard to the transport of dangerous goods by rail.

Provisions of Section 10 concern only international transport of RAW and are fully compatible with:

- Council Directive 92/3/Euratom of 3 February 1992 on the supervisions and control of shipments of RAW between Member States and into and out of the Community,
- Commission Decision of 1 October 1993 establishing the standard document for the supervision and control of shipments of RAW referred to in Council Directive 92/3/Euratom.

9.2 Report on Experience with Transboundary Transport of SF in 1995 - 1997

The original strategy in the former Czechoslovakia for the end of fuel cycle was based on a contract about transport of SF back to the USSR where the fresh fuel had been bought. The necessary five-years down-cooling of SF of VVER 440 type after it is removal from storage tanks in reactor units and before the transport to the USSR had been designed and also implemented in a central facility for the whole Czechoslovakia in ISFSF at the NPP Jaslovské Bohunice site. For this reason, no such ISFSF facility was included into the design of NPP Dukovany. Therefore until 1992 SF from NPP Dukovany had been transported to NPP Jaslovské Bohunice. After Czechoslovakia split into the Czech Republic and the Slovak Republic in 1993, it was necessary to build a SF interim storage in NPP Dukovany and to transport SF back to the country, which in 1993 already represented a transboundary movement.

International transports of SF from Slovakia to the Czech Republic were performed by rail, based on a series of SÚJB resolutions issued in agreement with all relevant IAEA recommendations „Rules for safe transport of radioactive materials – Safety Series No. 6, Edition 1985 (as amended and modified in 1990)“ and in agreement with the Convention on physical protection of nuclear materials INFCIRC/274/Rev. 1/Add. 7. Insurance of the transports was provided in agreement with the Vienna Convention on Civil Liability for Nuclear Damage and the Joint Protocol relating to the application of the Vienna and Paris Conventions.

In 1995 – 1997 fourteen reimportation transports took place of fuel spent in EDU, from the temporary storage ISFSF SE a. s. at NPP Jaslovské Bohunice back to ISFSF Dukovany.

The approval to use the design of the transport and storage packaging CASTOR-440/84 for transport of SF of VVER 440 type was also used for transit of irradiated nuclear fuel from EWN – Greifswald in Germany, via the Czech Republic, Slovakia to NPP Paks in Hungary. A special license for this transport was issued by SÚJB on 16 February 1996.

Throughout the mentioned period (1995 _ 1997) SÚJB paid maximum attention to these international transports of SF and SÚJB inspectors performed a number of inspections. It is possible to conclude, based on results of the performed inspections, that the inspections of transport identified no violation of requirements for nuclear safety, physical protection, and radiation protection and emergency preparedness.

10. Disused Sealed Sources – Article 28 of the Joint Convention

1. *Each Contracting Party shall, in the framework of its national law, take the appropriate steps to ensure that the possession, remanufacturing or disposal of disused sealed sources takes place in a safe manner.*
2. *A Contracting Party shall allow for reentry into its territory of disused sealed sources if, in the framework of its national law, it has accepted that they be returned to a manufacturer qualified to receive and possess the disused sealed sources.*

Section 18 paragraph 1 letter c) of the Atomic Act establishes the obligation to keep and archive records on ionizing radiation sources, facilities, materials, activities, quantities and parameters and other facts important from the viewpoint of nuclear safety, radiation protection, physical protection and emergency preparedness and to hand over the recorded data to SÚJB as laid down in an implementing regulation.

The same Act in Section 22 letter e) requires to maintain and to keep records about ionizing radiation sources and to communicate the recorded information to the Office as laid down in an implementing regulation;

The implementing regulation, Decree No. 307/2002 Coll., in Section 80 paragraphs 1 and 2 requires also the following documents and data about the ionizing radiation sources:

- source description enabling its unambiguous identification, namely its name, type designation, manufacturer's name, serial or identification number;
- purpose of source management;
- all licenses and other decisions concerning the ionizing radiation source management;
- operational records characterizing the method and scope of ionizing radiation source management; and for an unsealed source, its purpose and consumption balance; and
- records concerning the ionizing radiation source management, acquired in the framework of a systematic surveillance of radiation protection observance, and records of inspection activities,
- the date of physical acceptance of the ionizing radiation source;
- a document on the ionizing radiation source acquisition;
- for a ionizing radiation source that is subjected to a type-approval, except radionuclide sources, a conformity statement issued by its manufacturer, importer or distributor;
- for a sealed source, a certificate of sealed source;
- for an unsealed source, a standard document issued upon the transfer of the source by its previous owner;
- a protocol on an acceptance test, protocols on status tests and protocols on constancy tests;
- if a ionizing radiation source is transferred to another person, data indicating to whom and when the source was transferred; and for unsealed sources, also an accompanying document issued upon such a transfer;

- if a radionuclide source is released into the environment, the records on its release into the environment; and
- if a radionuclide source is disposed of as RAW, the data indicating to whom and when the source was transferred, and a standard document for RAW issued upon such a transfer.

The data under Section 80 paragraphs 1 and 2 of Decree No. 307/2002 Coll. shall be retained for at least 10 years after the termination of the ionizing radiation source management.

Licensees holding a license to use or store ionizing radiation sources shall send to the Office in written or another agreed form, to the state system of accounting for ionizing radiation sources the data on ionizing radiation sources they possess, except insignificant type-approved minor sources, unless the license condition establish otherwise. The movement of a sealed source is monitored from its manufacture or introduction into distribution until its disposal or storage. The storage option is used only if the sealed source fails to meet acceptance conditions for e disposal in a given repository.

All costs associated with sealed source management are born by the licensee holding a license for their management, i.e. starting from their takeover to their disposal in a RAW repository. Recommendations have been developed by SÚJB to handle disused sealed sources, which define the role of the Czech Police, Czech Customs Service and SÚRAO in the process and the duty of persons who find such a source to report the finding to SÚJB. According to Section 26 paragraph 3 letter k) of the Atomic Act, the found sources shall be administered by SÚRAO. Provided the owner of a found source is not identified the costs associated with its disposal or storage shall be paid from the state budget.

The described activities are supervised by SÚJB. Stable or portable detectors of ionizing radiation are used e.g. in metallurgical plants, scrap collecting centers and at border crossings.

To store disused sealed sources which fail to meet acceptance criteria for disposal in the Richard repository separate premises in the repository have been dedicated for this type of sources, in the form acceptance conditions for their storage. Among other conditions, the packaging assemblies of such sources shall be leak-tight and easy to handle throughout the storage time.

Tab. 10.1 Number and radioactivity of disused sealed sources stored in RAW repository Richard

Radionuclide	**Number of sources** [pcs]	**Total activity** [GBq]
^{147}Pm	1	1.34E-04
^{137}Cs	35	2.44E+05
^{60}Co	18	4.24E+05
^{252}Cf	1	3.38E-03
^{238}U	2	9.54E-01
^{226}Ra	1	3.66E-01
^{238}Pu	6	1.12E+02
^{239}Pu	38	2.43E+03
^{241}Am	223	3.37E+03
Total	**325**	**6.74E+05**

Tab. 10.2 Number and radioactivity of disused sealed sources disposed in RAW repository Richard

Radionuclide	Number of sources [pcs]	Total activity [GBq]
^{90}Sr	231	2.75E+03
^{65}Zn	1	1.77E-03
^{204}Tl	1	9.91E-02
^{147}Pm	4	4.70E+00
^{85}Kr	78	1.37E+03
^{3}H	8	4.35E+03
^{55}Fe	3	2.97E-01
^{137}Cs	296	3.62E+05
^{60}Co	812	4.91E+05
^{252}Cf	1	1.39E+01
^{144}Ce	2	1.81E-03
^{106}Ru	3	1.24E-02
^{133}Ba	5	1.32E-04
^{22}Na	1	7.59E-07
^{57}Co	4	3.73E-05
^{89}Sr	1	2.65E-02
^{239}Pu	42	1.21E+03
^{241}Am	173	7.56E+03
^{14}C	14	1.43E+01
Total	**1680**	**8.70E+05**

The Czech legislation enables reimportation of a sealed source by its manufacturer as specified in Section 5 paragraph 3 of the Atomic Act: *„An import of radioactive waste into the territory of the Czech Republic, with the exception of the re-import of ionizing radiation sources produced in the Czech Republic or radioactive waste originated from materials exported from the Czech Republic for the purpose of their processing or reprocessing having been approved by the Office, is prohibited."*

Tab. 10.3 Number and radioactivity of disused sealed sources disposed in RAW repository Bratrství

Radionuclide	Number of sources [pcs]	Total activity [GBq]
^{210}Pb	7	8,72E-01
^{226}Ra	173	4,16E+02
Total	**180**	**4,17E+02**

11. Planned Activities to Improve Safety

11.1 Nuclear Power Plant Dukovany

The radiation monitoring system at NPP Dukovany will be extended to include the so-called monitoring of airflow from the drying system of SF packagings. The system will perform inspection of hermetic tightness of fuel assemblies in the course of cask drying and at the same time it will check the released airflow for activity.

The system will be used for drying of modified CASTOR 440/84M casks to be used for transport of SF and its storage in the newly developed SF storage facility in Dukovany.

Treatment of radioactive sludge and ion exchangers has been tested in a pilot plant using immobilization in the so-called SIAL matrix. At present, equipment and premises are being prepared to utilize the technology to treat sludge and ion exchangers. Acceptability of a product resulting from the treatment for RAW Repository Dukovany has been verified by safety analyses.

A waste crusher and equipment for removal of cable insulation are being commissioned to minimize the volume of solid RAW.

11.2 Nuclear Power Plant Temelín

As both the units of NPP Temelín were put into permanent operation on 11 October 2004, all activities aimed at safety improvement were on an ongoing basis incorporated in the operating procedures as a part of commissioning of the nuclear installation.

11.3 ÚJV Řež a. s.

The RRRFR program (Russian Research Reactor Fuel Return) which is a part of the GTRI initiative (Global Threat Reduction Initiative) has been launched on 26 May 2004 and is supported by IAEA and US government. The aim of the project is to return fresh and spent highly enriched fuel (enrichment > 20% wt. ^{235}U) of Russian (Soviet) origin, currently stored by foreign operators of research reactors, into the Russian Federation. ÚJV Řež a. s. has been also involved in the program as the operator of LVR-15 reactor which uses IRT-2M fuel type with the initial enrichment of 36% and 80% wt. ^{235}U.

As at 31 December 2004 the HLW storage facility hosted 240 pcs. of fuel assemblies IRT–2M (enrichment 80 % wt. ^{235}U), whose transfer into the Russian Federation for storage and reprocessing has been a subject matter of a contract between the program parties. For the purposes of transport and storage of SF from research reactors Škoda JS, a. s. company developed a Škoda VPVR/M cask for 36 fuel assemblies or hermetic cases containing fuel assemblies of Russian (Soviet) origin. The Škoda VPVR/M cask was type-approved by SÚJB for transport and storage of SF on 23 March 2005. This cask can be used for the transport of SF to the Russian Federation.

In parallel with preparations for transport of SF IRT-2M a national program for rehabilitation of environmental liabilities has been under way in ÚJV Řež a. s., which includes repackaging (see chapter 4.1.3.3), as well as transport of fuel EK-10 into the Russian Federation. It has been planned that all fuel assemblies EK-10 stored dry in the box No. V (190 drums, 200 l each) and wet in the pool B of the HLW storage facility (16 pieces) should be repacked into hermetic cases, placed into baskets of Škoda VPVR/M cask, inserted into the casks in the hot cell of the HLW storage facility and transported to the Russian Federation.

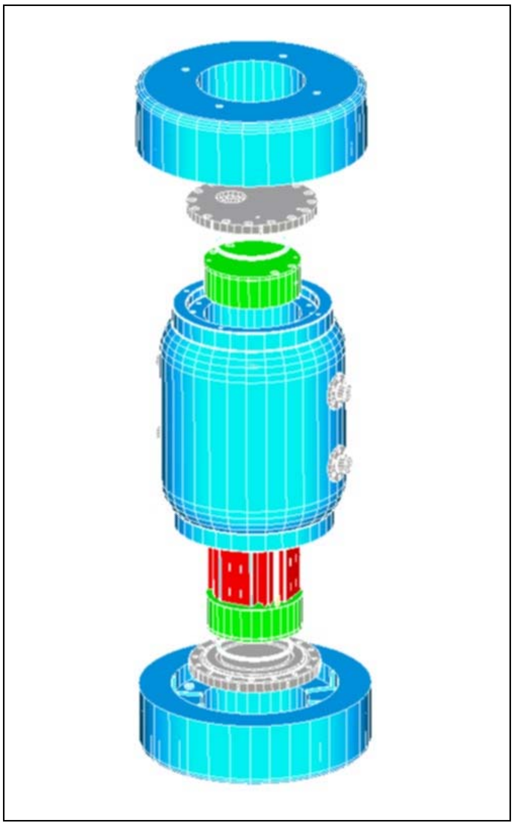

Fig. 11.1 Škoda VPVR/M cask with shock absorbers, basket, primary and secondary lids

11.3.1 Building 241 – RAW Management Facility Velké zbytky

See chapter 8.2.4.1.

11.3.2 Building 211/8 – HLW Storage Facility

See chapter 8.2.4.2.

11.3.3 Other Facilities

ÚJV Řež a. s. has facilities that were in the past used for RAW management and some of them are no more in operation. The facilities are part of old environmental damages and have been gradually liquidated (see chapter 8.2.4). These facilities contain RAW from operation and from refurbishment of the nuclear installation or workplaces with ionizing radiation sources accumulated earlier. They are the following facilities:

- building 211/6 – Reloading center for RAW,
- building 241 – Velké zbytky (RAW management facility), containing technology for treatment and processing of RAW,
- storage area for RAW Červená skála,
- building 211/5 – Decay tanks for RAW.

11.4 SÚRAO

11.4.1 RAW Repository Richard

A project has been under way under the PHARE program to close a chamber in the Richard repository – the project is divided into two stages: the first stage consists of the technical solution itself, including necessary safety analyses and the second stage is its implementation to be funded based on results of the first stage. The supplier is DBE Technology. Technical specification was developed in late July 2004. The project in continuing under the schedule. The implementation of chamber closing in the Richard repository will follow after completion of the design.

11.4.2 RAW Repository Bratrství

A feasibility study is being developed, based on SÚJB license to operate RAW repository Bratrství, for different closing options of the selected chamber, particularly evaluation of radiation exposure for the individual variants, both for the operating personnel and for the surrounding environment.

11.4.3 RAW Repository Dukovany

Research activities have been under way concerning further specification of radionuclides behavior in a nearby field (migration parameters), properties of sealing and backfilling materials in respect to the chemistry in the repository premises and host environment.

11.4.4 RAW Repository Hostím

No further activities are foreseen.

12. Appendices

12.1 List of SF Management Facilities

Tab. 12.1 List of SF Management Facilities

Location	Facility name	Storage capacity [pieces PS]	Storage capacity [tons of HM]
Dukovany	SF pool reactor unit 1	699	83
	SF pool reactor unit 2	699	83
	SF pool reactor unit 3	699	83
	SF pool reactor unit 4	699	83
	ISFSF	5 040	600
Temelín	SF pool reactor unit 1	703	396
	SF pool reactor unit 2	703	396
Řež	SF pool in HLW storage facility	465	
	SF dry store in HLW storage facility	190	
	Wet tank	60	
	SF storage facility	80	

12.2 List of RAW Management Facilities

Tab. 12.2 List of RAW Management Facilities

Licensee for RAW management	Facility	Storage/Disposal capacity
EDU	**Storage of liquid RAW**	
	– RAW concentrate tanks	4500 m^3
	– storage tanks for active sorbents	460 m^3
	Gathering, storage and processing of solid RAW	
	– sorting workplace and storage of solid RAW	1000 t
ETE	**Storage and processing of liquid RAW (BPP)**	
	– storage tanks for active sorbents	200 m^3
	– RAW concentrate tanks	520 m^3
	Collection, storage and processing of solid RAW (BPP)	
	– sorting workplace and storage of solid RAW	856 m^3
SÚRAO	**Repository Richard***	8 300 m^3
	Repository Bratrství**	1 200 m^3
	Repository Dukovany	55 000 m^3
	Repository Hostím	1 690 m^3
ÚJV Řež a. s.	**Velké zbytky**	
	– storage facility for liquid RAW	163 m^3
	– storage facility for solid RAW	49 m^3
	High-level waste storage facility	300 m^3
	Storage area Červená skála	198 m^3
	Reloading center for RAW	1400 m^3

* - total space mined out about 17 050 m^3
** - total space mined out about 3 500 m^3

12.3 List of Nuclear Installations in the Decommissioning Stage

At the development time of this National Report (April 2005) there were no NIs and other facilities associated with SF management on the Czech Republic's territory in the stage of decommissioning. The school reactor ŠR–0 with a zero output, situated in Pilsen –Vochov, was decommissioned by decontamination and dismounting in 1995–1997. The workplace ceased to exist in 1997.

12.4 SF Inventory

Tab. 12.3 SF Inventory as on 31 December 2004

Location	Facility Name	Number of stored FAs [pieces]	Weight of stored FAs [tons of HM]
Dukovany	SF pool reactor unit 1	488	58
	SF pool reactor unit 2	607	72
	SF pool reactor unit 3	538	64
	SF pool reactor unit 4	637	76
	CASTOR-440/84 cask at the service area in HVB I.	84	10
	ISFSF	4536	540
Temelín	SF pool reactor unit 1	84	41
	SF pool reactor unit 2	42	21
Řež	SF pool in HLW storage facility	240 + 16**	0.0585
	SF dry storage in HLW storage facility	190***	0.265
	Wet tank	30	
	SF storage facility	51 + 12*	

Explanations:
* – fuel type IRT–2M, 36 % wt. ^{235}U+ IRT–2M, 80 % wt. ^{235}U
** – fuel type IRT–2M, 80 % wt. ^{235}U + EK–10, 10 % wt. ^{235}U
*** – fuel type EK–10, 10 % wt. ^{235}U

12.5 RAW Inventory

Tab. 12.4 Inventory of solid low- and intermediate-level RAW as on 31 December 2004

Licensee for RAW management	Facility	Used storage/disposal capacity
EDU	Storage of liquid RAW	2 424 m^3
	Storage of degraded sorbents	303 m^3
	Gathering, storage and processing of solid RAW	495 t
ETE	Processing of liquid RAW (BPP)	228 m^3
	Collection, storage and processing of solid RAW (BPP)	274.7 m^3
SÚRAO	Repository Richard	6 260 m^3
	Repository Bratrství	880 m^3
	Repository Dukovany	4 733 m^3
	Repository Hostím	330 m^3
ÚJV Řež a. s.	Velké zbytky	49 m^3
	Storage area Červená skála	198 m^3
	HLW storage facility	5.2 m^3
	Reloading center for RAW	590 m^3

More details are provided in chapter 4.2.

12.6 Overview of the Czech Legislation

12.6.1 An Overview of Legislation on Utilization of Nuclear Energy and Ionizing Radiation and Related Regulations

The following paragraphs contain an overview of valid legal regulations concerning nuclear energy and ionizing radiation.

12.6.1.1 Atomic Act and its Implementing Regulations

12.6.1.1.1 Atomic Act and Related Acts

- Act No. **18/1997 Coll.**, on peaceful utilization of nuclear energy and ionizing radiation and on amendments to and alterations of some acts,
- Act No. **13/2002 Coll.**, amending the Act on peaceful utilization of nuclear energy and ionizing radiation (Atomic Act) and on amendments to and alterations of some acts, as amended later,
- Act No. **505/1990 Coll.**, on metrology, as enacted by Act No. 119/2000 Coll., Act No. 258/2000 Coll., on protection of public health and on alterations in some related acts, as

amended later, and Act No. 2/1969 Coll., on establishing of ministries and other central state administration bodies of the Czech Republic, as amended later,

- Act No. **83/1998 Coll.,** amending and altering Act No. 50/1976 Coll., on land planning and building regulations (Building Act), as amended later, and on amendments to and alterations of some other acts (Art. VI change of Section 6 of the Atomic Act),
- Act No. **71/2000 Coll.,** amending Act No. 22/1997 Coll., on technical requirements for products and on amendments to and alterations of some other acts (Art. X –change and modification of Section 23 of the Atomic Act),
- Act No. **132/2000 Coll.**, on modification and revocation of some acts related to the Act on Regions, Act on Municipalities, Act on District Offices and Act on the capital of Prague (Art. XX.– cancellation of Part II of Atomic Act – effective since 1 January 2001),
- Act No. **249/2000 Coll.**, to amend Act No. 19/1997 Coll., on some provisions associated with the ban on chemical weapons and on amendments to and alterations of Act No. 50/1976 Coll. on land planning and building regulations (Building Act), as amended later, of Act No. 455/1991 Coll., on trade licensing (Trade Licensing Act), as amended later and of Act No. 140/1961 Coll., Criminal Act, as amended later – extension of SÚJB competence,
- Act No. **281/2002 Coll.**, on some provisions associated with the ban on bacteriological (biological) and toxin weapons and on alterations in the Trade Licensing Act – extension of SÚJB competence.
- Act No. **320/2002 Coll.**, altering and revoking some acts in connection with the terminated activities of district offices (Part 11, Article CXI, altering and amending Act No. 18/1997 Coll., as amended later).

12.6.1.1.2 SÚJB Decrees

- Decree No. **317/2002 Coll.**, on type-approval of packagings for transport, storage and disposal of nuclear materials and radioactive substances, on type-approval of ionizing radiation sources and transport of nuclear materials and specified radioactive substances (on type approval and transport),
- Decree No. **144/1997 Coll.**, on physical protection of nuclear materials and nuclear installations and their classification,
- Decree No. **145/1997 Coll.**, on accounting for and control of nuclear materials and their detailed specification, as enacted by Decree No. **316/2002 Coll.,**
- Decree No. **146/1997 Coll.**, specifying activities directly affecting nuclear safety and activities especially important from radiation protection viewpoint, on requirements for qualification and professional training, on methods for verification of special professional competence and issue of authorizations to selected personnel, and the form of documentation to be approved for licensing of training of selected personnel, as enacted by Decree No. **315/2002 Coll.,**

- Decree No. **179/2002 Coll.**, establishing a list of selected items and items of dual use in the nuclear area,
- Decree No. **307/2002 Coll.**, on radiation protection,
- Decree No. **214/1997 Coll.**, on quality assurance in activities associated with nuclear energy use and radiation practices and on establishing criteria for classification and categorization of selected equipment into safety classes,
- Decree No. **215/1997 Coll.**, on criteria for siting of nuclear installations and very significant sources of ionizing radiation,
- Decree No. **318/2002 Coll.**, on details for assurance of emergency preparedness at nuclear installations and workplaces with sources of ionizing radiation and on requirements for the content of on-site emergency plans and of emergency rules , as amended by Decree No. 2/2004,
- Decree No. **106/1998 Coll.**, on nuclear safety assurance of nuclear installations during their commissioning and operation,
- Decree No. **195/1999 Coll.**, on requirements for nuclear installations to assure nuclear safety, radiation protection and emergency preparedness,
- Decree No. **185/2003 Coll.**, on decommissioning of nuclear installations and workplaces in categories III or IV,
- Decree No. **324/1999 Coll.**, establishing concentration and quantity limits of nuclear materials not subject to provisions about nuclear damages,
- Decree No. **319/2002 Coll.**, on function and organization of the radiation monitoring network,
- Decree No. **419/2002 Coll.**, on personal radiation passes.

12.6.1.1.3 Other Regulations

- Government Order No. **46/2005 Coll.**, amending Government Order No. 416/2002 Coll., establishing amounts of allocations and method of their payment by generators of radioactive wastes to the nuclear account and amounts of annual contributions to municipalities and rules for their provision,
- Decree No. **360/2002 Coll.**, issued by the Ministry of the Industry and Trade, establishing creation of a reserve for decommissioning of nuclear installation or workplaces in categories III or IV,
- Non-registered ministerial regulation issued by the Ministry of the Industry and Trade, No. **MPO 9/1997,** defining the statute of SÚRAO,
- Government Order No. **11/1999 Coll.**, on emergency planning zone.

12.6.1.2 Related Regulations

- Communication No. **67/1998 Coll.**, on agreement to the Nuclear Safety Convention,
- Act No. **71/1967 Coll.**, on administrative procedure (Rules of Administrative Procedure), as amended later,
- Act No. **44/1988 Coll.**, on protection and utilization of mineral riches (Mining Act),
- Act No. **552/1991 Coll.**, on state inspection, as amended later,
- Act No. **368/1992 Coll.**, on administrative fees, as amended later,
- Decree No. **76/1989 Coll.**, on safety assurance of technical equipment in nuclear energy industry, as amended later,
- Act No. **2/1969 Coll.**, on establishing of ministries and other central state administration bodies of the Czech Republic (as enacted and amended later),
- Act No. **140/1961 Coll.,** Criminal Act (as enacted and amended later),
- Act No. **17/1992 Coll.**, on the environment,
- Act No. **244/1992 Coll.**, on assessment of impacts of development concepts and programs on the environment,
- Act No. **111/1994 Coll.**, on road transport, as amended later,
- Decree No. **187/1994 Coll.**, implementing the Act on road transport, as amended later,
- Act No. **50/1976 Coll.**, on land planning and building regulations (Building Act),
- Decree No. **132/1998 Coll.,** implementing some provisions of the Building Act,
- Decree No. **137/1998 Coll.**, on general technical requirements for construction,
- Act No. **123/1998 Coll.**, on the right for information about the environment, as amended later,
- Decree No. **220/1998 Coll.**, on method and scope of assessment of compliance of food, method of preparation and collection of samples from food and tobacco products by the producer, on food types requiring a written declaration of compliance to be issued by the producer or importer and on the scope and content of the declaration (assessment of compliance), as amended later,
- Act No. **106/1999 Coll.**, on free access to information, as amended later,
- Act No. **594/2004 Coll.,** implementing the regime of the European Communities to control export of goods and technologies of dual use,
- Act No. **22/1997 Coll.**, on technical requirements for products and on amendments to and alterations of some other acts, as amended later,
- Decree No. **321/1999 Coll.**, issued by the Ministry of the Industry and Trade to alter the Decree No. 560/1991 Coll., issued by the Federal Ministry of Foreign Trade, on the conditions to issue official permits to import and export goods and services, as amended later,

- Government Order No. **1/2000 Coll.**, on railway shipping rules for public railway freight transport, as amended later (particularly Section 14 thereof),
- Act No. **123/2000 Coll.**, on medical means and alterations in some related acts.(Sections 7, 23, 24, 28 and 38),
- Act No. **124/2000 Coll.**, to amend Act No. 174/1968 Coll., on state professional supervision of labor safety, as amended later, Act No. 61/1988 Coll., on mining activities, explosives and state mining administration, as amended later, and Act No. 455/1991 Coll., on trade licensing (Trade Licensing Act), as amended later (Section 6 letter b)),
- Act No. **219/2000 Coll.**, property of the Czech Republic and its treatment in legal relations, as amended later,
- Decree No. **62/2001 Coll.**, on national property management by state organizational units and state organizations,
- Decree No. **225/2000 Coll.**, issued by the Ministry of Transport and Communications, specifying conditions of basic postal services and basic quality requirements of their assurance by the postal service licensee (Decree on basic services provided by postal services licensees) - Section 3,
- Act No. **244/2000 Coll.**, amending Act No. 91/1996 Coll., on animal food (Section 3 paragraph 13),
- Decree No. **350/2000 Coll.**, regulating sale of medical means (Section 1 paragraph 2 letter e, Section 2 paragraph 1 letter m), paragraph 2 letter I), Appendix to the Decree, letter h),
- Decree No. **37/2001 Coll.**, on hygienic requirements for products which come to direct contact with water and on water treatment (Section 3),
- Decree No. **89/2001 Coll.**, defining conditions to classify works into categories, limit levels for biological exposure tests and particulars of reports on works with asbestos and biological agents (Section 4 paragraph 3 and Appendix No. 1 item 6),
- Act No. **100/2001 Coll.**, on evaluation of impacts in the environment and alterations in some related acts (Act on Evaluation of Impacts on the Environment),
- Act No. **164/2001 Coll.**, on natural healing sources, sources of natural mineral water, natural healing spas and spa locations and on alterations in some related acts (Spa Act), as amended later – Section 3,
- Government Order No. **178/2001 Coll.,** establishing conditions for health protection of employees at work,
- Government Order No. **181/2001 Coll.,** establishing technical requirements for medical means, as amended later (Government Order No. 336/2001 Coll.),
- Act No. **185/2001 Coll.**, on wastes and alterations in some other acts, as amended later,
- Act No. **258/2000 Coll.**, on protection of public health and on alterations in some related acts, as amended later.

12.6.1.3 Emergency Legislation

- Constitutional Act No. **110/1998 Coll.**, on Czech Republic's security, as amended later,
- Act No. **148/1998 Coll.**, on protection of confidential facts and alterations in some acts, as amended later,
- Government Order No. **246/1998 Coll.,** defining lists of confidential facts, as amended later,
- Act No. **353/1999 Coll.**, on prevention of serious accidents caused by selected dangerous chemical materials and chemical preparations and on alteration of Act No. 425/1990 Coll., on district offices, regulation of their competence and other related provisions, as amended later (Act on Prevention of Serious Accidents),
- Act No. **239/2000 Coll.**, on integrated rescue system and alterations of some acts, as amended later,
- Act No. **240/2000 Coll.**, on crisis management and alterations of some acts (Crisis Act), as amended later,
- Decree No. **328/2001 Coll.**, issued by the Ministry of the Interior on some details of integrated rescue system assurance,
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